

Preliminary Staff Assessment

**CALIFORNIA
ENERGY
COMMISSION**

COSUMNES POWERPLANT PROJECT

Application For Certification (01-AFC-19)
Sacramento County

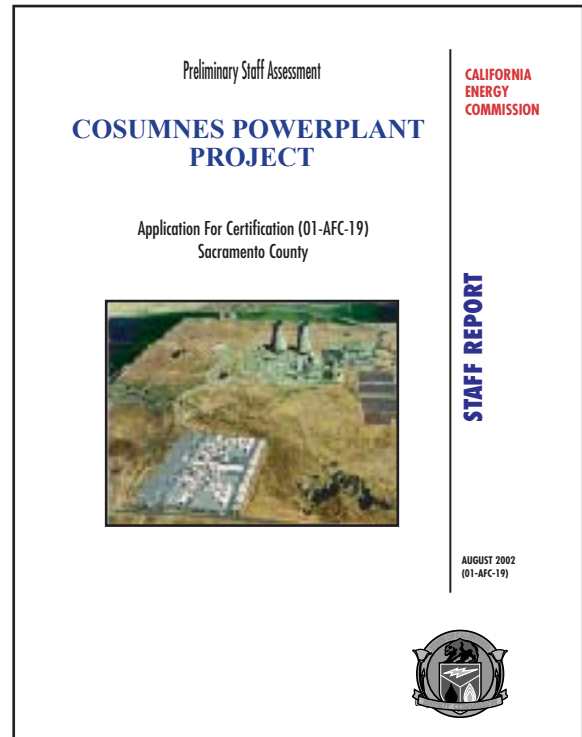


STAFF REPORT

**AUGUST 2002
(01-AFC-19)**



Gray Davis, Governor



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EXECUTIVE SUMMARY

On September 13, 2001, the Sacramento Municipal Utility District (SMUD) filed an Application for Certification (AFC) with the Energy Commission to construct and operate the Cosumnes Power Plant (CPP). The Energy Commission deemed the application complete at its November 14, 2001 business meeting. The analyses contained in this PSA are based upon information from: 1) the AFC; 2) responses to data requests, workshops, and site visits; 3) supplementary information from federal, state, and local agencies; 4) existing documents and publications; and 5) staff research.

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent analysis and recommendations on the CPP. The CPP and related facilities such as the electric transmission lines, natural gas line, and water supply lines are under the Energy Commission's jurisdiction (Pub. Resources Code § 25500). When issuing a license, the Energy Commission acts as lead state agency (Pub. Resource Code § 25519(c)) under the California Environmental Quality Act (Pub. Resource Code §§ 21000 et seq.). Its process has been certified by the Secretary for Resources, allowing the Commission's siting plan documentation to be used in lieu of an environmental impact report (Cal. Code Regs., tit. 14 § 15251(k)).

It is the responsibility of the Energy Commission staff to complete an independent assessment of the project's potential effects on the environment, the effects on the public's health and safety, and determine whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). Staff also recommends measures to mitigate potential significant adverse environmental impacts and conditions for the construction, operation, and eventual closure of the project, if approved by the Energy Commission. This preliminary assessment is based on the information available at this time.

This PSA is not the decision document for the Energy Commission. It is preliminary in nature and represents preliminary conclusions at the staff level only. The final decision on the proposed project will be made by the Commissioners of the California Energy Commission only after submission of a Final Staff Assessment (FSA) and testimony of the applicant and other parties, and evidentiary hearings. The Commissioners will consider the recommendations of all interested parties, including those of the Energy Commission staff; the applicant; intervenors; concerned citizens; and local, state, and federal agencies, before making a final decision on the application to construct and operate the CPP.

PROJECT LOCATION AND DESCRIPTION

The proposed CPP project site is located approximately 0.5 miles south of the Rancho Seco Nuclear Plant (currently undergoing decommissioning), 25 miles southeast of the City of Sacramento, in Sacramento County. The site consists of approximately 30 acres of an overall 2,480-acre site owned by SMUD. See **Project Description Figure 1** for the regional location of the project.

The project as proposed by SMUD, is a nominal 1,000 MW natural gas fired, combined cycle facility, using cooling tower technology. Electricity generated by CPP would be transmitted over 0.4 miles of new 230kV double-circuit transmission line from the on-site switchyard to the existing switchyard at Rancho Seco. Water would be supplied from the American River, delivered by the Folsom-South Canal. Fuel for the natural gas-fired turbines would be piped through a new 26-mile natural gas line located between the project site and the Carson Ice-Gen Cogeneration Facility, also located in Sacramento County.

Associated equipment would include emission control systems necessary to meet the proposed emission limits. NO_x emissions would be controlled using a selective catalytic reduction (SCR) system in the heat recovery steam generators (HRSGs). SMUD proposes to provide space in the HRSG for a high-temperature oxidation catalyst system in case the project cannot meet the proposed carbon monoxide emissions. A more complete description of the project is contained in the **Project Description** section of this PSA.

SMUD has proposed to build the project in two 500 MW phases, with the first phase planned to commence construction in 2003 and commercial operation in 2005. SMUD would decide in 2003 whether to proceed with Phase 2 or to defer construction to a future date. SMUD estimated that construction of Phase 2 would take 18 months and would not be operational prior to 2008.

To the extent sufficient information is available, staff analyzed the impacts of both phases of the proposed project. However, there are three technical areas for which staff could not fully assess both phases of the project, air quality, transmission system engineering, and soil and water resources. As a result, only the first 500 MW is actually being considered for licensing during this proceeding. When SMUD is prepared to move forward with Phase 2 of the project, at a minimum, a supplement to the AFC will be required for further analysis and licensing.

Originally, SMUD proposed to discharge process wastewater (plant cooling water) to Clay Creek, located northwest of the project site. On July 10th, SMUD informed staff they have modified the project to include a zero-liquid discharge (ZLD) system designed to eliminate off-site disposal of wastewater. With a ZLD system, process wastewater would be reclaimed and reused, to the extent possible. Cooling water would be cycled approximately 12 times in the cooling tower; wastewater would then be directed to a brine crystallizer. Sanitary wastewater from sinks and toilets would be discharged to an onsite septic tank and leach field. ZLD would be used in both phases, interconnected for process redundancy.

SMUD intends to investigate the possibility of incorporating a source of reclaimed water to supplement Phase 2 of the project (the second 500 MW), in order to reduce the use of fresh water. SMUD has identified the possibility of a) using reclaimed water, b) offsetting the use of freshwater with recharging groundwater, or c) displacing the use of freshwater with other reclaimed water projects within the county. SMUD has stated that they are committed to further study of these options prior to construction of Phase 2.

SMUD has only identified enough air emission offsets for Phase 1 of the project. Therefore, the Determination of Compliance from the Sacramento Metropolitan Air Quality Management District would only provide approval for a 500 MW facility. If and when SMUD decides to construct Phase 2, SMUD would need to identify and provide additional air emission offsets for the Energy Commission to assess.

Due to the uncertain future demands and constraints on the Northern California electric transmission system, staff is unable to assess impacts (e.g., overloads) that could occur in 2008 (the earliest Phase 2 would be operational). If and when SMUD decides to construct Phase 2, SMUD would need to provide additional transmission system impact studies for the future on-line date of Phase 2 for the Energy Commission to analyze.

As discussed above, SMUD intends to investigate additional process cooling water sources for Phase 2. Staff needs to fully evaluate the potential impacts of the selected water source prior to making conclusions or recommendations regarding the Phase 2 portion of the project.

PUBLIC AND AGENCY COORDINATION

Publicly noticed workshops were held on the following topics: project phasing, air quality, biological resources, cultural resources, noise, soil and water resources, traffic and transportation, transmission system engineering, visual resources, waste management. Workshops were held in the community of Herald, at the Rancho Seco Plant conference room, and at the Energy Commission offices.

Several of the workshops were attended by local, state and federal agencies including, but not limited to: Sacramento Metropolitan Air Quality Management District (SMAQMD), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), Department of Toxic Substances Control, Central Valley Regional Water Quality Control Board (CVRWQCB), and Sacramento Regional County Sanitation District. These workshops have been held by staff to understand the issues and concerns of the public, intervenors, agencies, and the applicant. Many helpful comments were received during the workshops.

In addition to these workshops, extensive coordination has occurred with the numerous local, state, and federal agencies that have an interest in the project.

Written comments on this PSA are encouraged and will be considered in staff's Final Staff Assessment (FSA).

STAFF'S ASSESSMENT

Each technical area section of the PSA contains a discussion of impacts, and where appropriate, mitigation measures and conditions of certification. The PSA includes staff's assessments of:

- the environmental setting of the proposal;

- impacts on public health and safety, and measures proposed to mitigate these impacts;
- environmental impacts, and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation; and
- proposed conditions of certification.

OVERVIEW OF STAFF'S CONCLUSIONS

At this time, staff is unable to complete three sections of this PSA, Visual Resources (Section 4.12), Alternatives (Section 6), and Appendix A -- Alternative Cooling Options Analysis. Staff intends to complete those analyses within the next two to three weeks. Staff will file and distribute those sections under separate cover.

Aside from Visual Resources, based on the information to date, staff believes that the project's environmental impacts can be mitigated to less than significant levels in all areas, except for Air Quality, Biological Resources, Cultural Resources, Noise and Vibration, Transmission System Engineering, and Water and Soils Resources. Staff's analysis also indicates that the project can comply with all LORS except in the areas of Air Quality, Biological Resources, Noise and Vibration, Transmission System Engineering, and Water and Soils Resources. With the receipt of the additional information identified in the PSA, it is likely that the project's impacts may be mitigated to less than significant levels and applicable LORS met. Below is a summary of the potential environmental impacts and LORS compliance for each technical area.

Technical Discipline	Environmental/ System Impact	Conforms with LORS
Air Quality	Inconclusive	Inconclusive
Biological Resources	Inconclusive	Inconclusive
Cultural Resources	Inconclusive	Yes
Power Plant Efficiency	No	N/A
Power Plant Reliability	No	N/A
Facility Design	N/A	Yes
Geology, Mineral Resources, and Paleontology	Impacts mitigated	Yes
Hazardous Materials	Impacts mitigated	Yes
Land Use	No	Yes
Noise and Vibration	Inconclusive	Inconclusive
Public Health	Impacts mitigated	Yes
Socioeconomics	No	Yes
Traffic and Transportation	Impacts mitigated	Yes
Transmission Line Safety	No	Yes
Transmission System Engineering	Inconclusive	Inconclusive
Visual Resources	To be determined	To be determined
Waste Management	No	Yes
Water and Soil Resources	Inconclusive	Inconclusive
Worker Safety	No	Yes

The following summarizes staff's position with respect to the technical areas listed as "Inconclusive." For a more complete discussion of conclusions, see the respective technical sections of the PSA.

Air Quality

There are a number of outstanding air quality issues that have the potential to delay the overall project schedule and have hindered staff's efforts to draw conclusions in the PSA.

- The applicant has proposed that the turbine/HRSG power train emissions of NO_x and CO to be maintained at 2.5 ppm and 6 ppm, respectively, while maintaining the slip of ammonia (NH₃) emissions to 10 ppm. However, the federal Environmental Protection Agency (EPA) determined that Best Available Control Technology (BACT) for similar projects is at 2 ppm for NO_x, 2 ppm for CO and 5 ppm for ammonia. Staff believes that the project should be designed to achieve these levels, but the EPA will not officially comment on this project until after their review of the Preliminary Determination of Compliance (PDOC).
- Staff believes that even after consideration of SMUD's provided offsets that are in accordance with SMAQMD rules, there may still be an unmitigated adverse impact to the area in the vicinity of the proposed plant. To offset this probable adverse impact, staff believes that additional NO_x, PM₁₀ or PM_{2.5}, and SO_x offsets are necessary to reduce these impacts to less than significant levels, preferably from the local area.

- At this time, SMAQMD has only completed a draft PDOC. The PDOC for public and agency review and comment is not expected to be available until mid- to late-August 2002 after which a 30-day (minimum) comment period would follow. SMAQMD staff will need time (typically 30-60 days) to respond to public and agency comments and prepare the Final Determination of Compliance (FDOC).

Biological Resources

A number of outstanding issues exist that must be addressed by SMUD before staff can determine whether the project would be consistent with biological resource LORS and whether impacts would be mitigated to a less than significant level. The following is a list of key outstanding items and issues that must be resolved before staff can complete the FSA:

- A complete identification (using U.S. Army Corps of Engineers (ACOE) 1987 manual) and assessment of the wetlands that are located within 250 feet on either side of the gas pipeline, access road, and laydown area.
- A complete Biological Assessment that contains measures to mitigate all of the impacts to federally-listed species and their habitat, that has been submitted to the ACOE and accepted by the USFWS and NMFS as complete.
- A revised pipeline alignment that avoids the Laguna Stone Lake Preserve and a biological survey for the alternate alignment.
- A Streambed Alteration Agreement Application(s) for the 34 crossings that have not been previously submitted, accepted as complete by the CDFG (in addition to the 3 already accepted as complete by the CDFG).
- A Clean Water Act Section 401 and 404 Application for a Permit filed and accepted as complete by the ACOE and CVRWQCB, respectively.
- Identification of areas within Sacramento County proposed for habitat compensation and impact mitigation for giant garter snake, valley elderberry longhorn beetle, burrowing owls, Swainson's hawk, vernal pools, and wetlands.

Cultural Resources

There is additional cultural information needed before conclusions can be drawn and recommendations can be finalized regarding cultural resources that would be impacted by the CPP. Staff believes that presence/absence testing, remote sensing, and site evaluation, if necessary, should be completed prior to permitting so that staff can recommend appropriate mitigation for sites that might be encountered. Specifically, SMUD should provide the following information to allow staff to complete their analysis and recommend the appropriate mitigation measures and conditions of certification:

- Identification of any additional cultural resources sites and recordation of any potential cultural resources on a Department of Parks and Recreation 523 form.
- A demonstration of how those sites will be avoided or an evaluation of the cultural resources site for eligibility to the California Register of Historic Resources.

- Information regarding Native American involvement in the project including identification of any sacred sites.
- Results of remote sensing at prospective sites, if not previously provided to the Energy Commission.
- Results of the completion of presence/absence testing agreed upon in the confidential “Cultural Resources Testing Plan for Cosumnes Power Plant, Sacramento County, California.”

Noise

Staff concludes that even if additional noise reduction measures were implemented with the current design, the CPP would likely result in a significant adverse noise impact at one residence. Operational noise at the residence would exceed the 45 dBA nighttime standard of the Sacramento County Noise Element and staff’s recommended noise standard of 40 dBA. SMUD is currently negotiating with the landowner to relocate the residence in order to eliminate the impact. However, at this time, the negotiations have not been finalized.

Transmission System Engineering

During the past two years, several other projects have been proposed for the Sacramento area (Roseville Energy Facility (suspended), Rio Linda/Elverta Energy Facility (suspended), and Colusa Power Plant (withdrawn)). The status of these projects is uncertain, thus complicating staff’s determination of the appropriate scope of analysis for the project. Staff needs additional information to establish the most appropriate parameters for evaluating downstream impacts, transmission facilities and/or mitigation measures required for the reliable operation of the electrical transmission system.

Staff’s preliminary analysis indicates that there are no significant system reliability criteria violations under normal operation of the 500 MW CPP. Due to the uncertainties associated with the status of other generation projects in the area, staff has not fully evaluated downstream impacts, transmission facilities, and/or mitigation measures required for the reliable operation of the electrical transmission system. Staff needs the following information and analysis:

- Under all conditions, an assessment and evaluation of the 500 kV outages (N-1 and N-2 conditions). Identify mitigation measures required for system reliability criteria violations.
- Under light spring N-1 conditions and without Roseville Energy Facility and Rio Linda/Elverta Power Project, what is the overload on the Westley-Tracy 230 kV line with the 500 MW CPP.

Staff will work with SMUD to determine if additional studies that include the Roseville Energy Facility and Rio Linda/Elverta Power Project are needed.

Water and Soil Resources

Staff needs additional information regarding SMUD's flood encroachment and storm water management analysis. The analysis must include the CPP switchyard and maps/drawings that clearly depict the designs of proposed conveyance features.

RECOMMENDATIONS

Due to the remaining issues outlined above, staff cannot make a recommendation on the project at this time, but expects to receive additional information that will enable the completion of staff's analyses. With the additional information, staff will be able to make a recommendation in the FSA.

Through PSA workshops and issue resolution workshops, staff will attempt to resolve as many of these concerns and outstanding issues as possible prior to release of the FSA. Staff has identified the outstanding information needed to complete the analysis within each technical section of this PSA. Additionally, staff will issue new data requests to clarify staff's information needs. A number of information needs may require a significant amount of time to obtain, such as the SMAQMD FDOC and an accepted Biological Assessment from the USFWS.

In addition to the estimated time required for the SMAQMD's FDOC, a significant amount of time may be required for determinations from wildlife agencies regarding biological resources. Based on discussions with USFWS, Energy Commission staff believes that a substantial amount of additional information may be required to be submitted by SMUD prior to acceptance of the Biological Assessment by USFWS.

Staff cannot predict the amount of time that will be needed for parties to provide the needed information or for agencies to issue their determinations. For that reason, staff has proposed an FSA schedule that is linked to the receipt of the critical information identified above. Taking into consideration the amount of time necessary for analysis, review, revisions, and document preparation, staff needs a minimum of 30 days after all critical pieces of information and final determinations from the relevant agencies are received to complete the FSA.

**COSUMNES POWER PLANT (01-AFC-19)
PRELIMINARY STAFF ASSESSMENT**

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INTRODUCTION

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Sacramento Municipal Utility District's (SMUD or "applicant") Application for Certification (AFC) for the Cosumnes Power Plant (CPP) project. The PSA is a staff document. It is neither a Committee document (the Committee is comprised of two commissioners who have been assigned to the project to oversee the progress of the case), nor a draft Energy Commission decision. The PSA describes the following:

- the proposed project;
- the existing environmental setting;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations, and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies, and intervenors that may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified;
- project alternatives; and
- requirements for project closure.

The analyses contained in this PSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The PSA presents conclusions, recommendations, and proposed conditions of certification that apply to the design, construction, operation, and closure of the proposed facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulation section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, Staff's Environmental and Engineering Assessments, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 19 technical area assessments includes a discussion of:

- laws, ordinances, regulations, and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, section 25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, section 25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, section 25523 (d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts contained is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, sections 1742 and 1742.5(a)). Staff's independent review shall be presented in a report (Cal. Code Regs., tit. 20, section 1742.5).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, section 1743(b)). Staff is required to coordinate with other agencies to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, section 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, section 21080.5 and Cal. Code Regs., tit. 14, section 15251 (k)). The Energy Commission acts in the role of the CEQA lead agency and is subject to all other portions of CEQA.

The staff typically prepares both a preliminary and final staff assessment (FSA). The PSA presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions, and recommendations.

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the FSA, staff will conduct a number of workshops in Sacramento County to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, correct errors, and finalize conditions of certification to reflect areas where we have reached agreement with the parties. Responses to written comments on the PSA will be included in the FSA. The FSA serves as staff's testimony on a proposal.

The staff's assessment is only one piece of evidence that will be considered by the Committee in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated for a minimum of 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD is required to undergo a 15-day comment period. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any party may appeal the decision to the Energy Commission. A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the PSA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. The Energy Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission. Staff's proposed Compliance Monitoring Plan and General Conditions are included at the end of the PSA.

PROJECT DESCRIPTION

Kristy Chew

INTRODUCTION

On September 13, 2001 the Sacramento Municipal Utility District (SMUD or “applicant”) filed an Application for Certification (AFC) with the California Energy Commission for the construction and operation of the Cosumnes Power Plant (CPP), a proposed nominal 1,000-megawatt (MW) natural gas-fired, combined-cycle electric generating facility.

The proposed CPP site would be located approximately 25 miles southeast of the City of Sacramento, in Sacramento County, four miles north of the San Joaquin County line and five miles west of the Amador County line (see **Project Description Figure 1**). The project would be located on approximately 30-acres of an overall 2,480-acre area owned by SMUD. The project site is generally bound by the Rancho Seco Nuclear Plant (currently being decommissioned) to the north, Rancho Seco Reservoir to the east, State Route 104 (also known as Twin Cities Road) to the west, and Clay East Road to the south (see **Project Description Figure 2**).

Land immediately surrounding the CPP site is owned by SMUD. The nearest residence is located approximately 800 feet southwest of the site.

SMUD is proposing to build the project in two 500 MW phases, with the first phase commencing construction in 2003 and commercial operation in 2005. SMUD will decide in 2003 whether to proceed with Phase 2 or to defer construction to a future date. Although both phases will be examined in this proceeding, only the first 500 MW will actually be considered for licensing.

SMUD customers would be the first in line to receive electricity produced from the CPP and additional supply would be made available for purchase by the state-operated California Power Authority, which would pay market rate for the surplus energy (SMUD 2001i). SMUD has stated that the CPP would have an availability factor of 92 to 98 percent. (SMUD 2001a, § 2.2.16.)

PROPOSED PROJECT

The following are the major components of the power plant (see **Project Description Figure 3**):

- Four General Electric 7FA combustion turbine generators (CTGs) equipped with dry, low oxides of nitrogen (NO_x) combustors;
- Four heat recovery steam generators (HRSGs) (without duct burners);
- Two condensing steam turbine generators (STGs);
- Deaerating surface condensers;
- Two 9-cell mechanical-draft evaporative cooling towers; and

- A zero-liquid discharge system.

Each phase would have two combustion turbines, two HRSG, and one condensing steam turbine, and would utilize mechanical-draft cooling towers and a zero-liquid discharge system.

FUEL

Natural gas for the first 500 MW (Phase 1) of the project would be supplied to the project site by extending a natural gas pipeline 26 miles that would originate at the Carson Ice Generation Facility, in Sacramento County. In general, from the Carson Ice Generation Facility, the natural gas pipeline alignment follows the Union Pacific Railroad right-of-way south to Core Road. Then the alignment travels eastward along Core Road, continuing east and southeast through agricultural land to Eschinger Road. The pipeline would then cross the Cosumnes River and State Route 99 to Arno Road. The alignment would continue east along Arno Road to Valensin Road, Twin Cities Road (State Route 104), and Clay East Road to the CPP site (see **Project Description Figure 4**).

Gas pipeline installation methods include trenching (e.g., open-cut or soil excavation), boring (e.g., a boring machine with an auger or ramming device to “jack” the pipe into place), and horizontal direction drilling (HDD) (e.g., a pilot hole is drilled and the pipe is pulled through the hole). AFC Figure 6.1-2 shows locations of the proposed construction method for the 26-mile alignment (SMUD 2001a, §6.4). Construction would be limited to a designated construction corridor, generally 75 feet in width or less (SMUD 2001a, §8.2.5.2).

Two new natural gas compressor stations would be required to fuel Phase 2 of the project. One compressor station would be located at the existing connection of SMUD’s pipeline to Pacific Gas & Electric’s backbone pipeline 400/401 on County Road 29 near County Road 88 in Yolo County (see **Project Description Figure 5**). The 4,152 horse power, electric-driven, natural gas compressor station is anticipated to be skid mounted, approximately 10 feet x 20 feet x 8 feet high, surrounded on four sides by an acoustical wall or in an acoustical enclosure for noise attenuation (SMUD 2002p, §1.1.1.1).

The other compressor station would be located near SMUD’s existing Valve 190 station in Elk Grove, within the buffer area of the Sacramento Regional Wastewater Treatment Plant (see **Project Description Figure 6**). This station is anticipated to be a 2,191 horse power, skid mounted, electric-driven compressor, approximately 10 feet x 20 feet x 8 feet high, within a slatted fence enclosure or surrounded by acoustical walls or within an acoustical enclosure (SMUD 2002p, §1.1.1.2)

One new natural gas pipeline interconnection station and three new gas pipeline valve stations are also required for the CPP project (see **Project Description Figure 4**). All mainline valves would be below ground at these stations. The only items anticipated to be above ground at these stations would be the high head extensions for the valves (about 3.5 feet above the ground surface), a blow off stack (about 8 feet above the ground surface and 10 inches in diameter), and a remote terminal unit (to send and receive information regarding natural gas flow rates, pressures, temperatures, valve

positions, station entry, etc.). Each remote terminal unit would be enclosed in a 5-foot x 8-foot x 8-foot high structure. A slatted 6-foot cyclone fence topped with barbed wire would enclose each valve station. (SMUD 2002p, §1.1.2.)

The natural gas pipeline interconnection station would connect the new pipeline to SMUD's existing pipeline. It would be located across the street from Carson Ice Generation Facility and would be approximately 75 feet x 75 feet in size. The two valve stations that are proposed to be located near Core Road/Bruceville Road and Arno Road/Valensin Road would each be approximately 50 feet x 50 feet in size. However, the valve station proposed near Valensin Road/Alta Mesa Road would be approximately 100 feet x 100 feet in size. (SMUD 2002p; §1.1.2.)

WATER

SMUD proposes to use approximately 5,000 acre-feet (af) of water per year to meet both phases of the project's cooling and process water requirements (SMUD 2002ae, §8.14.4). SMUD has an existing water service contract with the U.S. Bureau of Reclamation that expires in 2012 for delivery of a maximum of 75,000 af per year via the Folsom-South Canal (which originates at Lake Natoma, which is located approximately 25 miles north of the CPP site on the American River). Of this amount, 15,000 af is water that was originally assigned to SMUD by the city of Sacramento and the remaining 60,000 af is Central Valley Project (CVP) water.

The point of delivery of the CVP water is through an existing turnout located approximately 700 feet upstream from the Laguna Creek siphon, on the Folsom-South Canal. Water from the turnout is pumped west through a 66-inch diameter pipeline to the Rancho Seco Plant. Water for the CPP would be diverted through an approximate 0.5-mile long, 12-inch diameter water pipeline to be located between the existing booster pump station (that pumps water to Rancho Seco Reservoir) and the CPP site. The reservoir pipeline can also use gravity flow to provide water from the reservoir to the CPP if the water supply pump station at Folsom-South Canal is not operational. (SMUD 2001a; §7.1.)

An onsite water treatment system would treat and condition the incoming raw water for use in the cooling towers, potable domestic water, plant service water, and to produce demineralized water for fogging combustion turbine inlet air and HRSG makeup water (SMUD 2001a; §7.1).

WATER DISCHARGE

SMUD has proposed the use of a zero-liquid discharge (ZLD) system to process all plant cooling water, resulting in no cooling water discharge (SMUD 2002ae, §3.14). The circulating water system blowdown, including water from the Folsom-South Canal, various process waste streams, and residues of anti-scalants and anti-biofouling chemicals would be processed by a brine concentrator and crystallizer to produce a dry salt cake product (SMUD 2002ae, §8.14.4.1). The salt cake would be hauled offsite to an appropriate landfill facility (SMUD 2002ae, §3.13).

Sanitary waste water from sinks, toilets, showers, and other sanitary facilities would be collected and discharged to a package sanitary waste treatment system and leach field,

eventually percolating into the groundwater (SMUD 2001a; §2.2.9.1 and SMUD 2002ae, Figure 2.2-1R2).

Stormwater runoff from the CPP would discharge into Clay Creek (SMUD 2002ae, §8.14.5.1)

ELECTRICITY DISTRIBUTION

Output from the CPP generators would be connected to the existing Rancho Seco Plant switchyard by means of three overhead 230-kV circuits, extending approximately 0.5 mile north from the facility to the Rancho Seco Plant switchyard (see **Project Description Figure 7**). Two circuits would be carried on one set of double circuit steel pole structures and one circuit would be carried on a single-circuit single pole structure, resulting in a total of two sets of transmission line towers (six towers in all). All three lines would be constructed as part of Phase 1 (SMUD 2002p, §1.3).

CONSTRUCTION ROAD

SMUD has proposed the development of a construction access road along the east side of the Rancho Seco Plant (see **Project Description Figure 7**). Construction workers and equipment would be brought to the CPP site by traveling east along Twin Cities Road, then turning south into the joint entrance of the Rancho Seco Plant and Rancho Seco Park. Vehicles would then follow the road to Rancho Seco Park for a short distance. Once past the park's entrance gate, vehicles would then turn south and follow a road that would be constructed from the gatehouse due south to Clay East Road. The new construction road would be two lanes, 24 feet wide (12 feet per lane), composed of asphaltic concrete on a raised gravel base, with several drainages to accommodate the naturally occurring seasonal flows. The road would be designed to accommodate heavy loads needed for construction of the plant (SMUD 2002p, §1.2.). Vehicles would then travel west on Clay East Road to the CPP site.

CONSTRUCTION LAYDOWN AND PARKING AREAS

A 20-acre construction laydown and parking, located south of the proposed CPP site, south of Clay East Road is proposed by SMUD (see **Project Description Figure 7**). SMUD proposes to restore and revegetate the laydown area after construction is complete (SMUD 2002u).

CONSTRUCTION SCHEDULE

The first 500 MW (Phase 1) is expected to be on-line by spring 2005 (SMUD 2001a, §2.2.15). By 2003, SMUD would determine whether to build the second 500 MW (Phase 2) or to defer construction (SMUD 2001h). Construction of Phase 1 is anticipated to take 24 months to complete and Phase 2 to take 18 months, with a 2-to 3-month idle period between phases. Commercial operation of Phase 2 is expected to begin spring 2008 if construction is not deferred by SMUD (SMUD 2001a, §1.2).

REFERENCES

SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.

SMUD (Sacramento Municipal Utility District) 2001h. SMUD Cosumnes Power Plant project website – project overview. <http://www.smud.org/cpp/project.htm>. 2001. Site accessed May 7, 2002.

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SMUD (Sacramento Municipal Utility District) 2002p. AFC Supplement B. April 15, 2002. Docket date April 15, 2002.

SMUD (Sacramento Municipal Utility District) 2002u. Data Response, Set 1I – Response to Data Request 22. May 6, 2002. Docket date May 6, 2002.

SMUD (Sacramento Municipal Utility District) 2002ae. AFC Supplement C – Zero Liquid Discharge Arrangement. July 18, 2002. Docket date July 19, 2002.

Project Description Figures 1 through 7

Project Description Figure 1 – Regional Location

Project Description Figure 2 – Appearance of the Cosumnes Power Plant Site, Looking North

Project Description Figure 3 – 11 x 17 figure of plant components

Project Description Figure 4 – Pipeline, Valve Stations, & Intertie Station

Project Description Figure 5 – Yolo County Compressor Station

Project Description Figure 6 – Elk Grove Compressor Station

Project Description Figure 7 – Location of Construction Access Road, Transmission Line Towers, and Construction Laydown

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Tuan Ngo, P.E.

INTRODUCTION

This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Cosumnes Power Plant (CPP). Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃) and its precursors: oxides of nitrogen (NO_x) and volatile organic compounds (VOC), particulate matter less than 2.5 microns (PM_{2.5}) and less than 10 microns in diameter (PM₁₀) and their precursors (NO_x, VOC, SO₂), and lead (Pb). Non-criteria air pollutants are addressed in the **Public Health** section of this document.

In completing this analysis, Energy Commission staff evaluated the following major points:

- whether the project is likely to conform with applicable Federal, State, and the Sacramento Metropolitan Air Quality Management District (District) air quality laws, ordinances, regulations, and standards, as required by Title 20, California Code of Regulations, section 1744(b);
- whether the project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, sections 1742.5 and 1742(b); and
- whether the mitigation proposed for the project is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, sections 1742.5 and 1742(b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

The federal Clean Air Act requires the proponent of any new major stationary sources of air pollution and any major modifications to major stationary sources to obtain a construction permit before commencing construction. This process is known as New Source Review (NSR). Its requirements differ depending on the attainment status of the area where the major facility is to be located. Prevention of Significant Deterioration (PSD) requirements apply in areas that are in attainment of the national ambient air quality standards. The NSR requirements apply to areas that have not been able to demonstrate compliance with national ambient air quality standards. The entire program, including both PSD and NSR permit reviews, is referred to as the federal NSR program.

Title V of the federal Clean Air Act requires states to implement and administer an operating permit program. Large sources are required to operate in compliance with the Title V requirements promulgated in Title 40, Code of Federal Regulations, Section 70. A Title V permit contains all of the requirements specified in different air quality regulations, which affect an individual project.

The U.S. Environmental Protection Agency (EPA) has reviewed and approved the District's regulations and has delegated to the District the implementation of the federal PSD, Non-attainment NSR, and Title V programs. The District implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations.

The CPP's gas turbines are also subject to the federal New Source Performance Standards (NSPS). These standards include a NO_x emissions concentration of no more than 75 parts per million (ppm) at 15 percent excess oxygen (ppm@15%O₂), and a SO_x emissions concentration of no more than 150 ppm@15%O₂.

STATE

California State Health and Safety Code, Section 41700, requires that: "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

LOCAL

As part of the Commission's licensing process, in lieu of issuing a construction permit to the applicant for the CPP, the District will prepare and present to the Commission a Determination of Compliance (DOC). The DOC will evaluate whether and under what conditions the proposed project will comply with the District's applicable rules and regulations, as described below. The District has provided staff with a draft Preliminary DOC (PDOC), which staff will incorporate into the staff analysis. The Commission staff will coordinate its air quality analysis with the District staff as they prepare the DOC, will review and comment on the Preliminary DOC to identify any issues of concern, and will incorporate the Final DOC recommended conditions of certification in its Final Staff Assessment.

The project is subject to the specific District rules and regulations that are briefly described below:

Rule 102 Makes it unlawful for a person to circumvent any applicable section of rules and regulations.

Rule 201 Provides an administrative procedure for the review of new sources of air pollution and of the modification and operation of existing sources through the issuance of permits.

Rule 202 Requires that a source be subject to a New Source Review (NSR) process if it is a new or modified stationary source. The NSR process includes an evaluation of Best Available Control Technology (BACT), an air quality impact analysis, and emission offsets.

- Section 304: States that inter-pollutant offsets are discouraged and may only be allowed between precursor contaminants. It further states that the Air Pollution Control Officer may approve the inter-pollutant offsets on a case-by-case basis, provided that the applicant demonstrates through the use of air quality modeling that the new emissions will not cause a new violation or contribute to an existing violation of the ambient air quality standard. In addition, it requires that inter-pollutant offsets used at a major stationary source must be approved, in writing, from the federal EPA.
- Sections 414, 415, 417 and 418: Require that calculations of emissions offset triggers and required for NO_x, VOC, PM₁₀, and SO₂ should be based on the potential to emit (maximum capacity) of the polluting units.

Rule 206 Defines BACT as the most cost effective emissions control device, emissions limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit.

Rule 401 Limits the discharge of air contaminants into the atmosphere through visible emissions and opacity.

Rule 402 Protects the public's health and welfare from the emission of air contaminants, which constitute a nuisance.

Rule 403 Regulates operations, which periodically may cause fugitive dust emissions into the atmosphere.

Rule 404 Limits the discharge of particulate matter in the atmosphere through the establishment of an emission concentration limit of 0.1 grains per dry standard cubic foot.

Rule 405 Limits the discharge of dust and condensed fumes into the atmosphere by establishing rates based on process weight.

Rule 406 Limits the emissions of sulfur compounds to no greater than 0.2 percent calculated as SO₂ and combustion contaminants to no greater than 0.1 grains per dry standard cubic foot (gr/dscf).

Rule 801 Establishes requirements for general definitions, monitoring, records, and administrative requirements applicable to the federal New Source Performance Standard (NSPS).

Rule 805 Establishes limits for NO₂ and SO₂ from new or modified stationary gas turbines with a designed heat rate input of 10 MMBtu/hr or more. The proposed turbines NO_x concentrations shall not exceed 75 ppm dry at 15% oxygen, and SO₂ concentrations shall not exceed 150 ppm dry at 15% oxygen.

Rule 901 Establishes the general definitions, monitoring and administrative requirements applicable to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP).

SETTING

METEOROLOGY AND CLIMATE

The project site is located 0.5 mile south of the Rancho Seco Facility, 25 miles southeast of the City of Sacramento, in southern Sacramento County. The area is characterized by relatively hot and dry summers, cold and moist winters, and cool and breezy springs and falls. The daily average temperature ranges from 47°F in winter to 77°F in summer. During late fall and winter, cold air from the surrounding mountains, low dispersion and stable atmospheric conditions produce fog in the valley, which normally burns off by mid-day.

The annual precipitation of the area is approximately 17.1 inches, with most of the rainfall occurring during the months of November through March. The area averages 58 rainy days per year.

The wind data collected at Executive Airport (SMUD 2001a, Appendix A), located approximately 22 miles northwest of the project site, shows that the wind direction and intensity vary significantly by season, although the predominant wind direction is from the south and southwest.

Mixing heights in the area have been estimated to range from approximately 350 meters in the morning to 1,600 meters in the afternoon (Holzworth 1972). High mixing heights, normally associated with unstable conditions, can lead to greater dispersion of air pollutants.

EXISTING AMBIENT AIR QUALITY

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the Air Resources Board (ARB), are typically lower (more protective) than the federal AAQS, which are established by the federal Environmental Protection Agency (EPA). The state and federal air quality standards are listed in **Air Quality Table 1**. As indicated in **Air Quality Table 1**, the averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 and $\mu\text{g}/\text{m}^3$).

Air Quality Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	0.12 ppm (235 µg/m ³)	Same as primary
Particulate Matter (PM ₁₀)	Ann.Geo. Mean	30 µg/m ³	---	Same as primary
	24-hour	50 µg/m ³	150 µg/m ³	
	Ann. Arith. Mean	---	50 µg/m ³	
Fine Particulate Matter (PM _{2.5})	24-hour	No separate standard	65 µg/m ³	Same as primary
	Ann. Arith. Mean		15 µg/m ³	Same as primary
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	None
	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
Nitrogen Dioxide (NO ₂)	1-hour	0.25 ppm (470 µg/m ³)	---	Same as primary
	Ann. Arith. Mean	---	0.053 ppm (100 µg/m ³)	
Lead(Pb)	30-day	1.5 µg/m ³	---	Same as primary
	Cal. Quarter	---	1.5 µg/m ³	
Sulfur Dioxide (SO ₂)	Ann.Arith. Mean	---	0.03 ppm (80 µg/m ³)	---
	24-hour	0.04 ppm (105 µg/m ³)	0.147 ppm (365 µg/m ³)	---
	3-hour	---	---	0.5 ppm (1300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	---	---
Sulfates	24-hour	25 µg/m ³	No federal standard	
H ₂ S	1-hour	0.03 ppm (42 µg/m ³)	No federal standard	

Source: California Air Resources Board

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. Where not enough ambient data are available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the

same air contaminant. The entire area within the boundaries of the air district is usually evaluated to determine the district's attainment status.

The proposed project area is designated as unclassified for federal PM₁₀ standards, attainment for federal SO₂ and NO₂ standards, and non-attainment for federal CO and ozone standards.

The project area is designated as non-attainment for the state ozone, PM₁₀, and CO standards, attainment for the NO₂, SO₂, lead, and sulfate standards, and unclassified for H₂S and visibility standards.

Air Quality Figure 1 summarizes the historical air quality data for the project location for PM₁₀, CO, SO₂, ozone (O₃), and NO₂. In **Air Quality Figure 1**, the normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicate that the highest measured concentrations were lower than the most stringent ambient air quality standard. Based on the ambient concentration data collected, the area is consistently maintained below the most stringent ambient air quality standards for all criteria pollutants except for PM₁₀ and ozone. Below is an in-depth discussion of ambient air quality conditions in the area for ozone, NO₂, CO, and PM₁₀.

Ozone

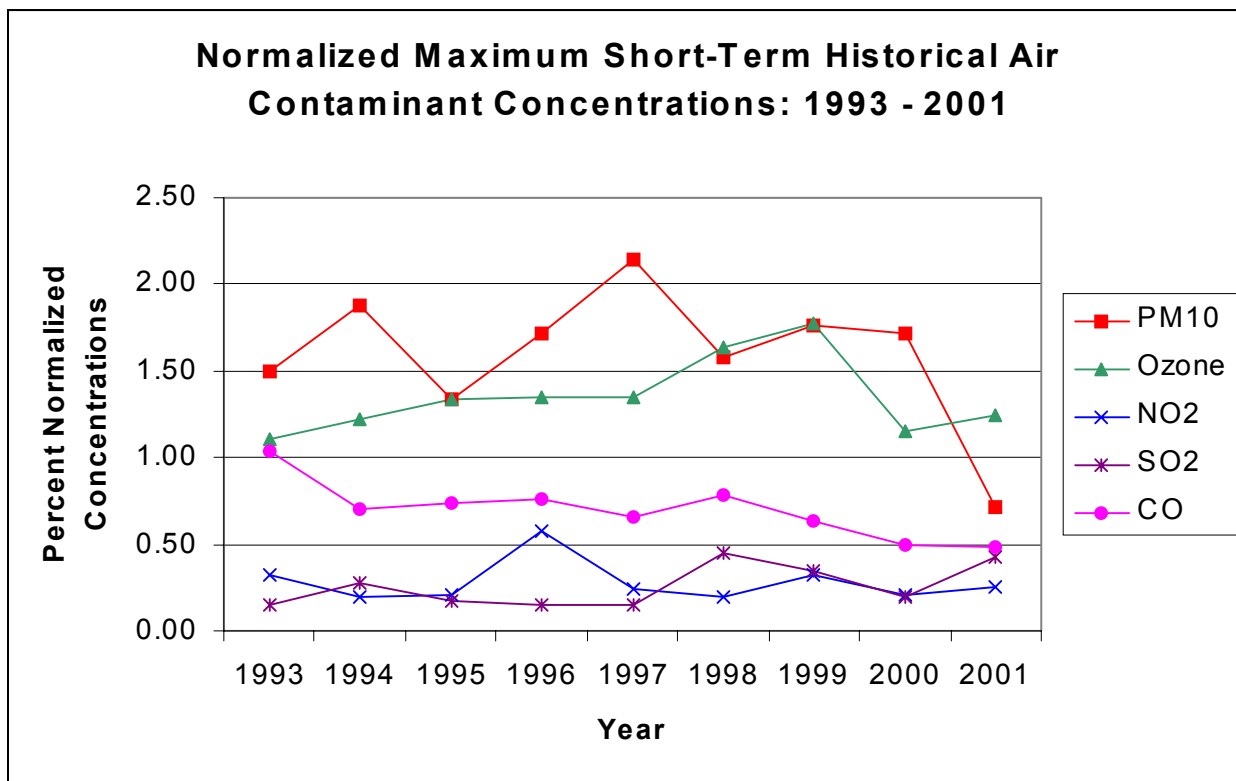
Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions between nitrogen oxides, volatile organic compounds, and to a lesser extent CO, interact in the presence of sunlight.

The peak ambient ozone concentrations, recorded between 1993 and 2001, have ranged from 10 to 16 parts per hundred million (pphm). The area experienced between 3 to 21 violation days a year of the state's 1-hour ozone air quality standard. Based on these recorded data, the area has experienced a slightly increased trend in both ozone concentration and the number of violation days.

Nitrogen Dioxide (NO₂)

As shown in **Air Quality Figure 1**, the highest NO₂ levels in the area, measured in 1996, are about half of the most stringent NO₂ ambient air quality standards. In other years, 1993 to 1995, and 1997 to 2001, the measured NO₂ levels are no more than 30 percent of the most stringent standard. Approximately 90 percent of the NO_x emitted from combustion sources is NO, while the balance is NO₂. NO is oxidized in the atmosphere to NO₂, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO₂ typically occur during the fall and not in the winter, when atmospheric conditions favor the trapping of ground level releases but lack significant photochemical activity (less sunlight). In the summer, the conversion rates of NO to NO₂ are high but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, preventing the accumulation of NO₂ to levels approaching the 1-hour ambient air quality standard.

Air Quality Figure 1



Source: Air Resources Board

NO_x-Ozone-VOC Relationship

Since the applicant proposes to surrender VOC emission reduction credits (ERCs) to offset facility NO_x emission increases, this section discusses the relationship among NO_x, ozone, and VOC which staff has observed in the project area. Because both VOC and NO_x are precursors to ozone, the inter-pollutant offsets can reduce ozone levels. However, staff believes that the use of such a trade must satisfy two requirements:

- the trade should mitigate the impacts caused by the facility, and
- the trade must not interfere with the progress toward attainment.

To demonstrate that the inter-pollutant offset, i.e., VOC for NO_x, would mitigate the project impacts on the ambient ozone air quality concentration, staff believes that a qualitative analysis of the relationship between NO_x-Ozone-VOC should be performed. To perform such an analysis, staff has relied on the actual ambient measurements of NO_x, VOC and ozone in the area in the last five years. Staff obtained multi-day NO_x-Ozone-VOC ambient concentration data for two episode years (1998 and 1999) when the 1-hour ozone air quality standard was exceeded. Staff also located two other multi-day NO_x-Ozone-VOC concentration data on days the ozone standard was not violated (also in 1998 and 1999) to prevent artificial bias of the data. These data have been compiled and presented in **Air Quality Figures 2, 3, 4, and 5**.

In **Air Quality Figures 2-5**, the actual hourly measurements of ozone, VOC (non-methane), and NO_x , and the calculated VOC/ NO_x ratio are presented. In order to better illustrate the peak and valley changes of the hourly VOC, NO_x , and ozone measurements, the hourly VOC concentrations in Figures 2-5 have been multiplied by 100, and the hourly concentrations of NO_x and ozone have been multiplied by 1,000.

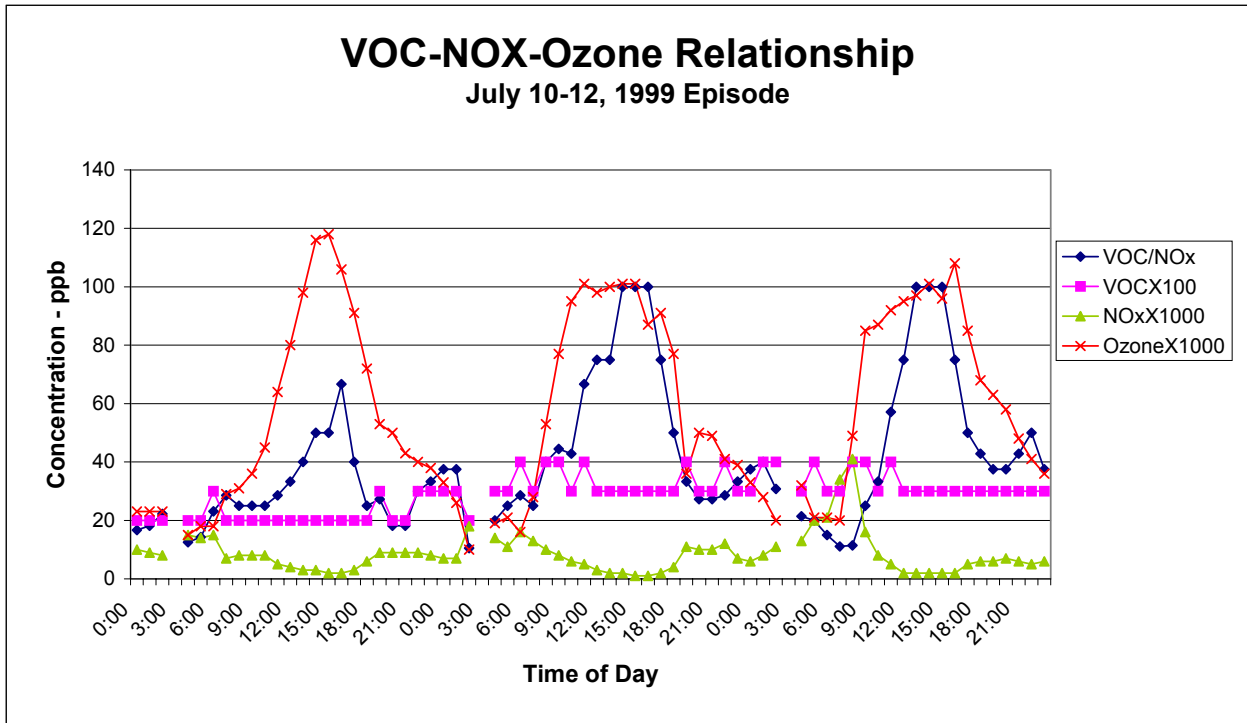
Staff draws the following conclusions from the data presented in **Air Quality Figures 2-5**:

- Ozone started to form by about 8 AM, and subsided by about 9 PM.
- VOCs are abundant in the atmosphere.
- Ozone concentrations are inversely proportional to NO_x level, i.e., if ozone concentrations are increased, the NO_x concentrations are decreased.
- The area ozone formation is not sensitive to the concentration of VOC in the atmosphere. This is evidenced by the fact that VOC concentrations remain constant, and that the VOC/ NO_x ratio is directly proportional to the ozone concentrations.
- The hourly VOC/ NO_x concentration ratios are in the range of 10 to 100 during the ozone exceedance days, and can be as high as 300 during the days where ozone air quality standard is not exceeded.

Staff also obtained some additional hourly ozone data for the four days in August 10 to 13, 1998, where ozone standards in Sacramento were exceeded. Staff also obtained hourly ozone measurements, for the same four days, in monitoring stations upwind and downwind of the area and presents them in **Air Quality Figure 6**.

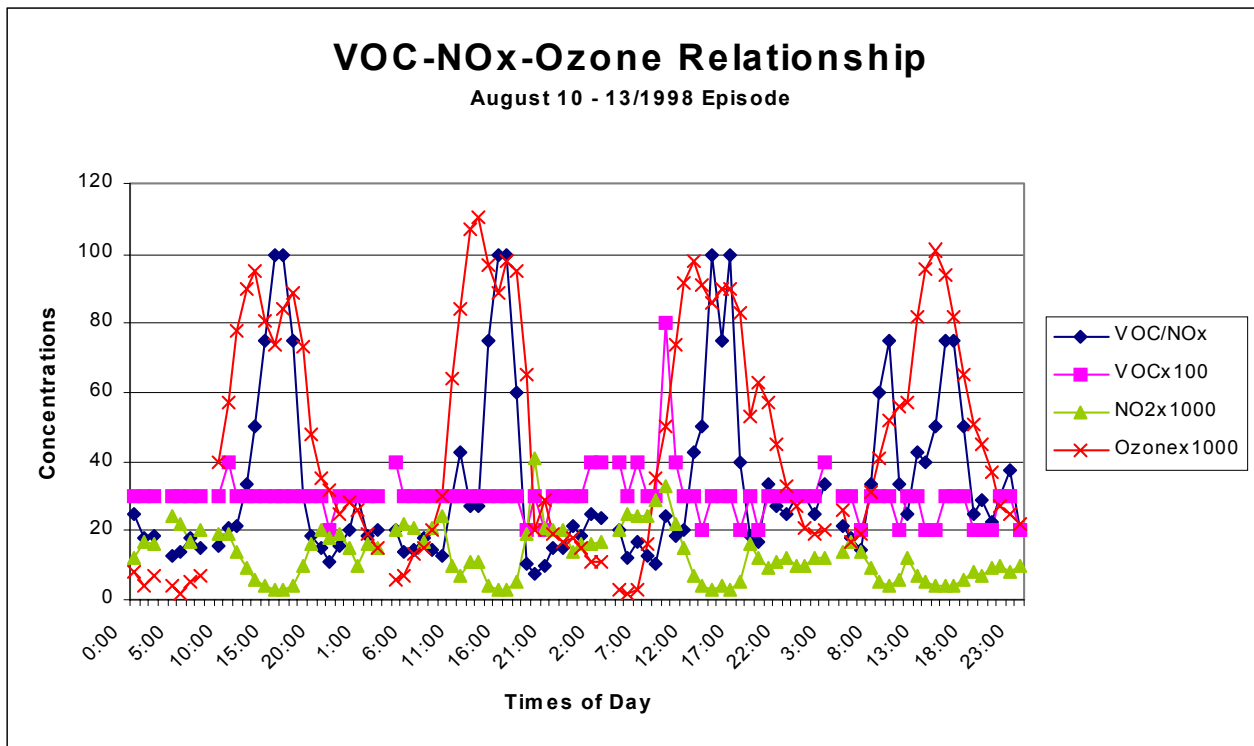
As shown in **Air Quality Figure 6**, the local area concentrations of ozone are higher than those measured in upwind monitoring stations in Fairfield and Stockton. In all but one day, there is not a violation of the 1-hour ozone air quality standard in upwind monitoring stations (Fairfield and Stockton), but the area experienced multi-day exceedances of the ozone standard. Except for August 10, 1998, the ozone concentrations in the area progressively worsened as the air mass moved toward downwind monitoring stations such as Sloughhouse, T Street, and Folsom. In addition, the peak ozone concentrations at the Sloughhouse, T Street, and Folsom monitoring stations seem to lag one to two hours behind those measured at the local area. For these episode days (August 10-13, 1998), the data indicate that the ozone violation in the local area is strongly influenced by localized emissions of NO_x and VOC.

Air Quality Figure 2



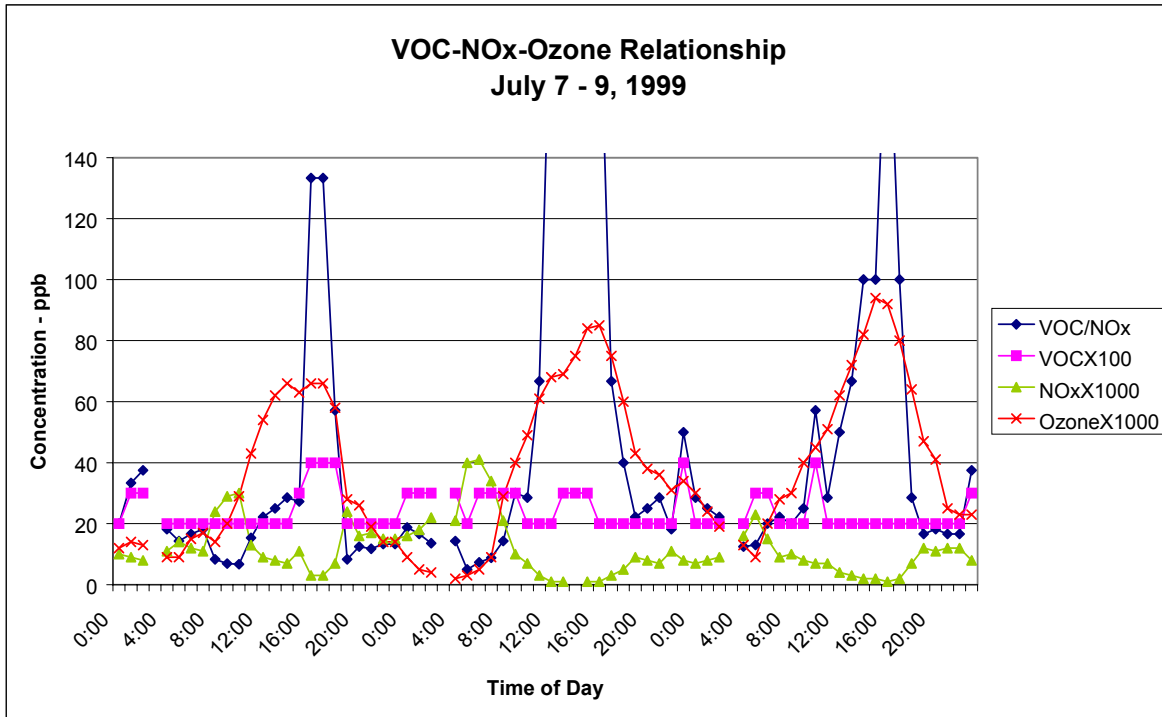
Source: Air Resources Board.

Air Quality Figure 3



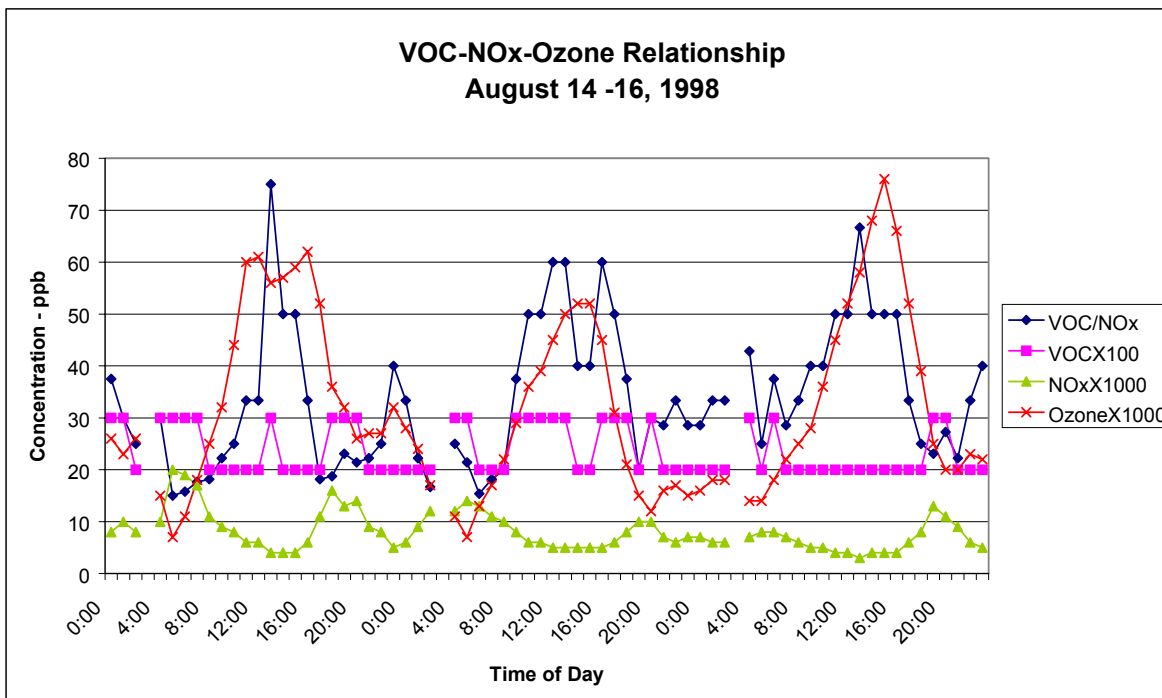
Source: Air Resources Board.

Air Quality Figure 4

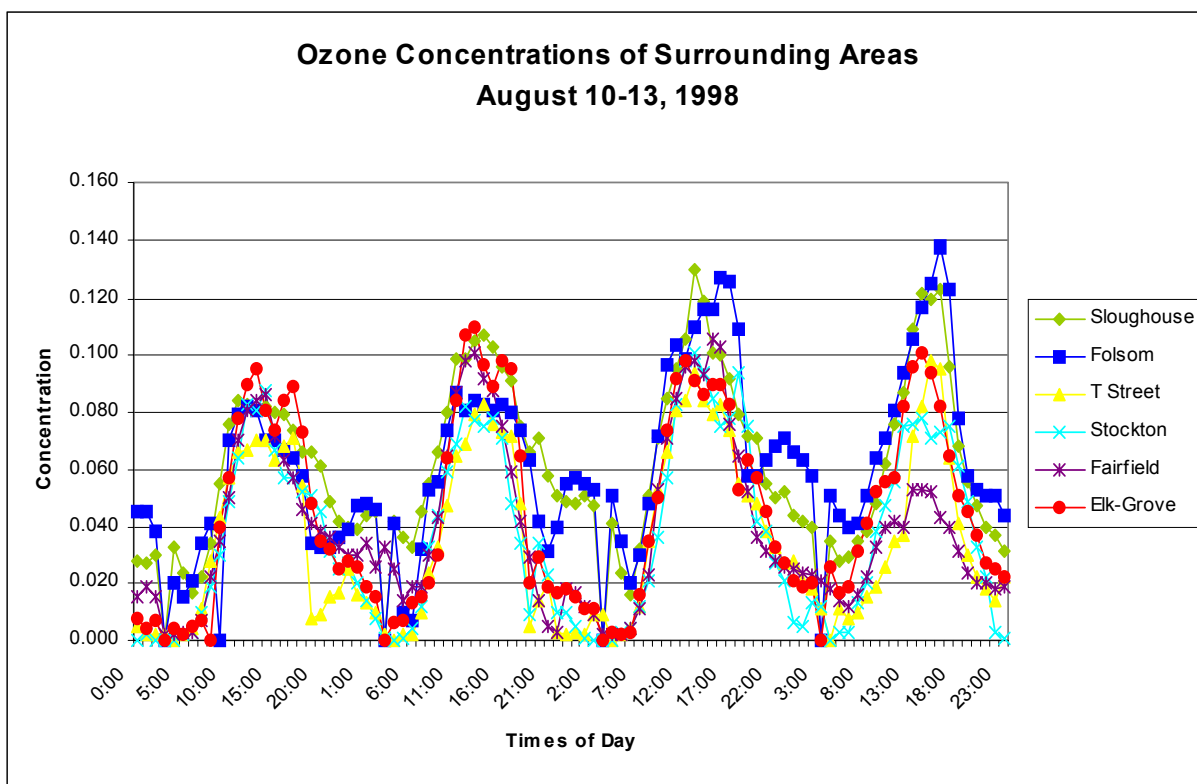


Source: Air Resources Board.

Air Quality Figure 5



Air Quality Figure 6



Source: Air Resources Board.

Carbon Monoxide (CO)

The highest CO concentration levels measured in the area in 1993 through 2001 are showing a steady declining trend (see **Air Quality Figure 1**). The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night, and may extend one or two hours after sunrise.

Particulate Matter (PM₁₀)

As shown in **Air Quality Figure 1**, PM₁₀ concentrations measured in the local area have shown persistent violations of the state 24-hour PM₁₀ standard over the last ten years. The highest PM₁₀ concentrations are normally measured in the winter, especially during evening and night hours. During wintertime high PM₁₀ episodes, the main sources of PM₁₀ contributions are wood smoke, combustion of fossil fuels, and residential activities. During each winter from the period 1993 to 2000, the area has experienced from two to seven violations of the state 24-hour PM₁₀ air quality standard. The area did not experience a violation of either the state or the federal PM₁₀ standards in 2001.

PROJECT EMISSIONS

CONSTRUCTION ACTIVITIES

The proposed project construction consists of two separate phases. Each phase involves the installation of two gas turbine/HRSG power trains, one cooling tower, and auxiliary equipment to produce approximately 500 MW of electricity. The first construction phase would last approximately 24 months, and the second phase would last approximately 18 months. For the purpose of this analysis, staff only provides an assessment of the first phase (500 MW) of the project.

Staff only analyzed the first phase (or 500 MW) of the project in this assessment for the following reasons:

- The applicant has not provided any definite information about the mitigation measures for the second phase of the project. Without this information, staff is not able to determine whether the impacts from the second phase of the project are effectively mitigated.
- Because of the rapid advance of emission control technology, a determination that today's control systems would satisfy future BACT requirements is shortsighted.
- The attainment status of the area can be subject to change, which may affect the determination of BACT and may prompt different offset requirements.

Construction generally consists of three major activities: site preparation, construction, and installation of major equipment and structures. All of these activities will result in fugitive dust emissions and construction equipment exhaust. A small amount of hydrocarbon emissions may also occur as a result of the temporary storage of petroleum fuel at the site. The applicant provided estimated peak daily and annual construction equipment exhaust emissions (SMUD 2001a). These estimated construction emissions are identified in **Air Quality Table 2**. Staff reviewed the applicant's estimated construction emissions and believes that they are accurate.

**AIR QUALITY Table 2
Construction Emissions**

Construction Emission Sources	NO _x	SO ₂	VOC	CO	PM ₁₀
Daily (lbs/day)	306	6	127	1470	50
Annual (tons/yr)	24.3	0.5	9.4	107.5	1.1
Fugitive Dust (tons/yr)					3.3

Source: SMUD 2001a.

PROJECT OPERATION

The first phase of the project would be built with the following major components:

- Two natural gas fired, General Electric (GE) model 7241FA combustion turbines,
- Two unfired heat recovery steam generators (HRSG),
- One steam turbine,
- One nine-cell cooling tower.

The turbines would be operating in combined cycle mode to produce approximately 500 MW of electricity. The facility is expected to be available between 92 to 98 percent and could operate up to 8,760 hours per year (SMUD 2001a, pp. 8.1-30). The applicant proposes to equip each combustion turbine with dry low NO_x combustors and a selective catalytic reduction (SCR) system in the HRSG, which together limit the NO_x emissions to 2.5 ppm@15% O₂. The applicant proposes to provide space in the HRSG for a high-temperature oxidation catalyst system if the project cannot meet the proposed CO emissions of 6 ppm (SMUD 2001a, pp. 2-3).

The applicant is requesting that the project be analyzed with the assumption of 180 hours of start up and shutdowns for each turbine each year (SMUD 2001a, pp. 8.1-30).

The facility's hourly, daily, and annual emissions were estimated based on information on the GE 7FA turbine and the following assumptions (SMUD 2001a, pp. 8.1-30):

- The facility maximum hourly emissions are estimated using one gas turbine in cold start and one turbine in full load operation.
- The maximum daily emissions are estimated using 3 hours of start up and 21 hours of full load operation for each turbine.
- The maximum annual emissions are estimated using 180 hours of start up and shut down, and full load at the remaining 8570 hours for each turbine.

The facility maximum hourly, daily, and annual emissions are presented in **Air Quality Table 3**.

Air Quality Table 3
Project Maximum Hourly, Daily and Annual Emissions
(First Phase)

	NO _x	SO _x	CO	VOC	PM ₁₀
Maximum Hourly Emissions (lbs/hr)					
Gas Turbines, Start up ¹	96.9	2.6	926.7	19.3	18.0
Gas Turbines, Steady State	27.0	2.6	49.4	6.6	18.0
Cooling Tower					0.2
Total	96.9	2.6	926.7	19.3	18.2
Maximum Daily Emissions (lbs/day)					
Gas Turbines ²	1,189	63	6,448	234.5	431
Cooling Tower					3.6
Total	1,189	63	6,448	234.5	435
Maximum Annual Emissions (ton/year)					
Gas Turbines	125.55	10.95	365.4	30	78.9
Cooling Tower					0.6
Total	125.55	10.95	365.4	30	79.5

Source: SMUD 2001a, Table 8.1-23.

1 Assume one turbine start and the other is in steady state operation.

2 Assume 3 hours of start up following by 21 hours of steady state operation.

INITIAL COMMISSIONING

Initial commissioning refers to a period of approximately 60 days prior to beginning commercial operation when the combustion turbines will undergo initial test firing. During this commissioning phase, the project may operate at a low-load for a long period of time for fine-tuning. The District typically requires that each activity of the commissioning period be planned carefully, and that all NO_x and CO emissions and the time of commissioning be optimized to lessen the emissions from the turbines. It should also be noted that the NO_x and CO emissions during the commissioning period are not higher than emissions during normal start up of the facility; therefore, staff expects no new impacts of the emissions during the commissioning period. All criteria air contaminant emissions during the commissioning period will be counted toward the annual emission limits; thus there is an incentive for the applicant to limit the commissioning period to the shortest time possible.

CLOSURE

Eventually the facility will close, either as a result of the end of its useful life, or through some unexpected situation, such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions will cease and all impacts associated with those emissions will no longer occur. The only other expected emissions will be fugitive particulate emissions from the dismantling activities. These activities will be short term and will create fugitive dust emissions levels much lower

than those created during the construction of the project. Nevertheless, staff recommends that a facility closure plan be submitted to the Energy Commission Compliance Project Manager (CPM) to demonstrate compliance with applicable District Rules and Regulations during closure activities.

AMMONIA EMISSIONS

Due to the large combustion turbines used in this project and the need to control NO_x emissions, significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. Not all of this ammonia will mix with the flue gases to reduce NO_x; a portion of the ammonia will pass through the SCR and will be emitted unaltered, out the stacks. These ammonia emissions are known as ammonia slip. The applicant has committed to an ammonia slip no greater than 10 ppm (SMUD 2001a, Table 8.1B-7). On a daily basis, a 10 ppm slip is equivalent to approximately 600 pounds of ammonia emitted into the atmosphere (SMUD 2001a, Appendix 8.1B, Table 1B-7).

IMPACTS

Air dispersion models provide a means of predicting the location and magnitude of the air contaminant impacts of a new emissions source at ground level. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Each model result provides an estimate of the concentration of the pollutant emitted by the project that will occur at ground level.

The applicant has used an EPA-approved ISCST3 model to estimate the impacts of the project's NO_x, PM₁₀, CO, and SO_x emissions resulting from project construction and operation. A description of the modeling analyses and results are provided in Section 8.1.5.2.2 (SMUD 2001a) and Tables 8.1-26R and 8.1-28R (SMUD 2002j). Staff added the applicant's modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

Inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the project site.

CONSTRUCTION IMPACTS

The results of the project construction impacts analyses are presented in **Air Quality Table 4**. The modeling analyses included both the fugitive dust and vehicle exhaust emissions, which include PM₁₀, NO_x, and CO. In **Air Quality Table 4**, the first and

second columns list the air contaminant, i.e., NO₂, PM₁₀, and CO, and the averaging time for each air contaminant analyzed. The third column presents the project emission impacts, and the fourth column presents the highest measured concentration of the criteria air contaminants in the ambient air (background). The fifth column presents the total impact, i.e., the sum of project emission impact and background measured concentration.

The applicant submitted modeling analysis shows that the project construction activities would cause a new violation of the state 1-hour NO₂ standard, and further exacerbate existing violations of the state 24-hour PM₁₀ standard. Staff reviewed the modeling and finds that:

- The project's construction impacts are not expected to be occasional or isolated events, and will occur over an area within the project's property fence lines where the general public does not have access. The impact drops off significantly at receptors further from the project's fence line. In fact, the project NO₂ construction impact at the closest residential receptor was 125 µg/m³, which when added to the background NO₂ concentration, would be 277 µg/m³, or about 60% of the applicable standard. Thus, the project construction 1-hour NO₂ impact indicates that it would not cause a new violation of the standard.
- Construction of the facility would result in unavoidable short-term PM₁₀ impacts. Because the area is non-attainment for PM₁₀, additional impacts during construction of the project can be viewed as significant. However, it is doubtful that the general public would be exposed to the maximum construction impacts associated with the project. Staff reviewed the modeling files and believes that the likely PM₁₀ construction impacts during the day would be in the range of 20 to 30 µg/m³. Nevertheless, because the area PM₁₀ standard is already violated, additional emissions beyond the fence line from construction of the project would exacerbate the existing violation. Therefore, the project's construction PM₁₀ emission impact is significant.

Staff believes that the PM₁₀ impacts from the construction of the project can be further reduced with the implementation of the staff recommended construction mitigation measures, as discussed in the **Mitigation** section.

OPERATION IMPACTS

The applicant provided staff with a modeling analysis of the project's operating emissions impacts from directly emitted pollutants, which they believe demonstrates that no new violations of ambient air quality standards would be caused by the operation of the project. Staff reviewed the applicant's modeling analysis and concludes that it is adequate.

Air Quality Table 4
Maximum Facility Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	State Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO ₂	1-hr.	125 ¹	152	277	470	60%
CO	8-hr.	256.1	8,165	8,421	10,000	84%
PM ₁₀	24-hr.	30 ¹	88	118	50	240%

Source: SMUD 2001a. Appendix 8.1A, Table 8.1A-5.

¹ Staff estimated impacts

Air Quality Table 5 presents the results of the modeling analysis using turbines' hourly emissions, which include steady state and start-up events. **Air Quality Table 5** shows that the project does not cause any new violations of any applicable air quality standard even with worst case ambient concentrations recorded, and thus those impacts are not significant. As for PM₁₀, staff believes that the project itself would contribute to existing violations of the state 24-hour PM₁₀ air quality standard. Therefore, the project's PM₁₀ emission impacts are significant.

Air Quality Table 5
Facility Operation Emission Impacts

Pollutants	Avg. Period	Impacts ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impacts ($\mu\text{g}/\text{m}^3$)	Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO ₂	1-hour (start up)	260.2	152.3	412.5	470 ¹	88%
	1-hour (steady state)	18.7	152.3	171	470 ¹	36%
	Annual	0.23	20.7	20.9	100 ²	21%
SO ₂	1-hour	1.4	78.6	80.0	655 ¹	12%
	24-hour	0.4	47.2	47.6	105 ¹	45%
CO	1-hour	977.5	9,200	10,178	23,000 ¹	44%
	8-hour	176.4	8,165	8,341	10,000 ¹	83%
PM ₁₀	24-hour	4.5	88	925.	50 ¹	185%
	Annual	0.24	21.3	21.5	30 ¹	72%

¹ State standards

² Federal standards

Source: SMUD 2002j. AFC Supplement A.

CUMULATIVE IMPACTS

Staff's cumulative impact assessment is comprised of two types of analyses. The first is an analysis of the project's directly emitted pollutants along with similar emissions from other foreseeable future projects that are currently under construction, or are currently under District review. The second is a discussion of the project's potential contribution to the formation of secondary pollutants, namely ozone and PM₁₀.

Directly Emitted Pollutant Impacts

To evaluate the direct emission impacts of the project along with other probable future projects, staff needs specific information that is included when project applicants file an application with the District for a permit. Projects located up to six miles from the proposed facility usually need to be included in the analysis. Staff assumes that impacts from projects beyond six miles would not effect the modeling analysis on a cumulative basis. The District has stated that there are no sources currently planned, being built, or are expected to be built within six miles radius of the project. Therefore, a cumulative impact analysis of directly emitted pollutants is not necessary.

Secondary Pollutant Impacts

Ozone impacts

The proposed project's gaseous emissions, primarily NO_x and VOC, can contribute to the formation of ozone. There are air dispersion models that can be used to quantify ozone impacts, but they are only appropriate for use in regional air quality planning efforts where numerous sources are input into the model to determine the regional ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, staff believes that the emissions of NO_x and VOC from the project do have the potential to contribute to higher ozone levels if not mitigated. The applicant has proposed to mitigate the project's contribution to the area's ozone violations with a combination of NO_x and VOC emission reduction credits from Sacramento, Placer, Sutter, and Yolo counties.

Secondary PM₁₀ impacts

The project's NO_x, VOC, NH₃, and SO_x emissions can contribute to the formation of secondary PM₁₀, namely organic condensable, nitrates, and sulfate particulate matter.

Not all volatile organic compounds can form secondary PM₁₀. VOC with six or less carbon atoms in the chain will not participate in the formation of the carbon based PM₁₀. The project's VOC emissions would be in the form of unburned natural gas, which is mostly methane and ethane, which contain only one to two carbon atoms. Thus, the turbine exhaust is not expected to emit any significant amounts of VOC that can participate in the formation of secondary PM₁₀.

Staff also believes that the project's ammonia and NO_x emissions have a potential to contribute to ammonium nitrate formation, which may worsen the violations of the state 24-hour PM₁₀ standard. Available research (Spicer, 1982) indicates that the conversion of NO_x to nitrate is approximately between 10 to 30 percent per hour in a polluted urban area where ozone and ammonia are present in sufficient amounts to participate in the reaction. Assuming a 30 percent NO_x to nitrate conversion rate and a linear extrapolation of the project's PM₁₀ modeling results, staff estimate that the project's NO_x and ammonia emissions can potentially add 2 µg/m³ of particulate nitrates (ammonium nitrate) to the ambient air. Because the area is non-attainment for the state 24-hr PM₁₀

standard, the ammonium nitrate contribution, although small, is significant if not mitigated.

Concerning sulfates as PM₁₀, staff believes that the project would contribute to sulfate levels in the area, although in a very small amount. Currently, there are no agency (EPA or CARB) recommended models or procedures for estimating sulfate formation. Nevertheless, studies during the past two decades have provided data on the oxidation rates of SO₂. The data from these studies can be used to approximate the conversion of SO₂ to particulate (typically about 0.01 to 1 percent per hour) with Gaussian dispersion models such as ISCST3. The modeling can be performed with and without chemical conversion (decay factor) and the difference corresponds to the amount of SO₂ that is converted to PM₁₀. This modeling was not performed, but staff believes that there is the potential for the project's SO₂ emissions to contribute to PM₁₀ formation, which is a serious air quality problem in the region. Thus, staff still recommends that offsets, in the form of emission reductions, be provided to lessen the project's contribution of SO_x to PM₁₀ violations.

VISIBILITY IMPACTS

The applicant has provided, as part of their PSD application to the District, a visibility impact analysis, which shows that the project is not expected to exceed any significant visibility impairment increment inside any nearby (Desolation Wilderness and Mokelumne Wilderness) PSD Class I areas (SMUD 2001a). Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective.

APPLICANT'S PROPOSED MITIGATION

CONSTRUCTION PHASE

The applicant proposes to implement Best Available Control Measures (BACM) during construction of the project (SMUD, 2001a). These measures are listed below:

- Frequent watering of unpaved roads and disturbed areas.
- Limit speed of vehicles within the construction areas.
- Employ tire washing and gravel ramps prior to entering a public roadway to limit accumulated mud and dirt deposited on the roads.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- Place sandbags adjacent to roadways to prevent run-off to public roadways.

- Install windbreaks at the windward sides of construction areas prior to the soil being disturbed. The windbreaks shall remain in place until the soil is stabilized or permanently covered.
- Employ dust sweeping vehicles to sweep the public roadways that are used by construction and worker vehicles.
- Limit on equipment idle times and regular preventive maintenance on construction equipment.
- Employ electric motors for construction equipment when feasible.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive over two weeks.
- Pre-wet the soil to be excavated during construction.
- Use ultra-low sulfur diesel fuel for construction engines that use diesel fuel.

In addition, the applicant would maintain the construction emissions to a maximum 20 percent opacity during any three minutes' span. Because the construction emissions are short-term, the applicant has not proposed any emission reduction credit to offset the new emissions.

OPERATIONAL PHASE

The applicant proposes to mitigate the emission increases from the proposed facility using a combination of clean fuel, emission control devices and emission reduction credits. The applicant proposes to use a combination of dry low-NO_x combustion design and Selective Catalytic Reduction (SCR) for each of the combined cycle turbine trains to minimize NO_x emissions. SMUD proposes to design and operate the SCR to maintain the turbines' NO_x emissions at 2.5 ppm on an hourly basis (SMUD 2001a). The applicant proposes that each of the combined cycle gas turbine power trains will maintain emission limits of 6 ppm for CO, 2 ppm for VOC, and 10 ppm for ammonia slip (from unreacted ammonia in the SCR). Natural gas will be the only fuel used, which will minimize the project's PM₁₀ and SO_x emissions. Below is a brief description of the emission control technologies that SMUD would employ.

Dry Low- NO_x Combustors

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NO_x formed during combustion. Because of the expense and efficiency losses due to the use of steam or water injection in the combustor cans to reduce combustion temperatures and the formation of NO_x, CTG manufacturers are presently choosing to limit NO_x formation through the use of dry low- NO_x technologies. In this process, firing temperatures remain somewhat low, thus minimizing NO_x formation, while thermal efficiencies remain high.

Selective Catalytic Reduction

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed in the HRSG. The applicant is proposing SCR to reduce NO_x emissions.

SCR refers to a process that chemically reduces NO_x by injecting ammonia into the flue gas stream, over a catalyst, in the presence of oxygen. The process is termed selective because the ammonia reducing agent preferentially reacts with NO_x rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950 to 1100°F.

Catalysts generally operate between 600 to 750°F (ARB 1992), and are normally placed inside the HRSG where the flue gas temperature has cooled. At temperatures lower than 600°F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called ammonia slip. At temperatures above about 800°F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770°F (EPRI 1990).

Regardless of the type of catalyst used, efficient conversion of NO_x to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream. Also, the catalyst surface has to be large enough to ensure sufficient time for the reaction to take place.

The applicant proposes to use a combination of a dry low-NO_x combustor and an SCR system to produce a maximum NO_x concentration exiting the HRSG stack of 2.5 ppm, corrected to 15 percent excess oxygen averaged over a 1-hour period.

OFFSETS

The proposed facility is required by the District to provide offsets on a quarterly basis (pound per quarter (ppq)) for NO_x, VOC, and PM₁₀. The applicant has purchased emission reduction credits, in the form of District issued banking certificates, from sources of offsets located in Sacramento, Placer, Sutter, and possibly, Yolo, counties to mitigate the project's emission impacts. The project emissions and emission reduction credits for NO_x, VOC, and PM₁₀ are presented in **Air Quality Tables 6, 7, and 8**. The next to last row of each table specifies whether the project will need additional offset mitigation or has a surplus. The last row of each table indicates whether the proposed offset mitigation is adequate. In summary, the applicant has provided approximately 41 tons of NO_x, 355 tons of VOC, 101 tons of PM₁₀ and 80 tons of SO₂ emission reduction credits to mitigate the project NO_x (125.55 tons per year), VOC (30 tons per year) and PM₁₀ (79.5 tons per year) emissions.

It should be noted that the District NSR rule (Rule 202) requires offsets to be provided on a quarterly basis. Thus even though the applicant has more available emission

reduction credits on a yearly basis, that amount is still not adequate to fully offset the project's emissions on a quarterly basis. **Air Quality Tables 6, 7, and 8** represent the facility emissions liability on a quarterly basis, and the available emission reduction credits that SMUD currently owns. It should be noted that the emission reduction credits have been adjusted with the appropriate distance trading ratio (between 1 to 1.5) as required by the District NSR rule. As indicated in **Air Quality Tables 6, 7, and 8**, the project is still subject to a shortfall of between 29,000 to 59,000 lbs of NO_x emission reduction credits per quarter to fully satisfy the District NSR requirement. Similarly, the project would need between 22,000 to 23,000 lbs of PM₁₀ emission reduction credits to fully satisfy the District NSR requirement.

Because of the shortfall of emission reduction credits to directly offset the project NO_x and PM₁₀ emissions, the applicant has proposed to use the extra VOC and SO₂ emission reduction credits to offset the NO_x and PM₁₀ emissions (called interpollutant trading). The applicant has proposed to trade two pounds of VOC emission reduction credits for each pound of NO_x emission increase. Similarly, they also propose to trade 1.5 pounds of SO₂ emission reduction credits for each pound of PM₁₀ emission increase. As discussed below, the District has proposed different interpollutant trading ratios than what the applicant has proposed.

Air Quality Table 6
Project NO_x Emissions and Offsets

NO _x Emissions and Credits ¹	Location	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Project Emissions		62021	62643	63265	63265
Burns Philip Food (ERC)	Yolo ²	0	195	801	333
General Mills (ERC)	Yolo ²	510	501	716	671
Holly Sugar (ERC)	Yolo ²	1177	21896	23047	23334
Blue Diamond (ERC)	Sacramento	3795	3946	4106	3659
Procter & Gamble (ERC)	Sacramento	5565	5565	5565	5565
Total ERC		11047	32103	34235	33562
Shortage		50974	30540	29030	29703
Offsets Adequate?		No	No	No	No

Notes: ¹All emission reduction credits have been adjusted with the appropriate distance factor (between 1.3 to 1.5) as required by the District NSR Rule (rule 202).

²Emission reduction credits from Yolo County is still under review by the Yolo County Board of Supervisor to be used outside of their air basin.

Air Quality Table 7
Project VOC Emissions and Offsets

VOC Emissions and Credits ¹	Location	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Project Emissions		14807	14958	15110	15110
Formica (ERC)	Placer	87132	49434	78930	60639
Swansons (ERC)	Sacramento	10657	13631	7762	16389
Procter & Gamble (ERC)	Sacramento	16667	16667	16667	16667
Donner Furniture (ERC)	Sacramento	263	505	439	523
Burns Phillip Food (ERC)	Yolo ²	0	3	13	6
Holly Sugar (ERC)	Yolo ²	47	799	821	843
Blue Diamond (ERC)	Sacramento	1060	1030	1067	1037
Ag Containers (ERC)	Sacramento	453	827	1040	347
Rancho Seco (ERC)	Sacramento	355	188	100	115
Total ERC		116634	83084	106839	96566
Surplus ERC		101827	68126	91729	81456
Offsets Adequate?		Yes	Yes	Yes	Yes

Notes: ¹All emission reduction credits have been adjusted with the appropriate distance factor (between 1.3 to 1.5) as required by the District NSR Rule (rule 202).

²Emission reduction credits from Yolo County is still under review by the Yolo County Board of Supervisor to be used outside of their air basin.

Air Quality Table 8
Project PM₁₀ Emissions and Offsets

	Location	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Project Emissions		38880	39312	39744	39744
Campbell Soup (ERC)	Sacramento	382	224	1239	438
Poppy Ridge (ERC)	Sacramento	685	663	493	659
Blue Diamond (ERC)	Sacramento	2320	2214	2289	2138
Procter & Gamble (ERC)	Sacramento	7512	7512	7512	7512
Grace Ind. (ERC)	Sacramento	2394	2393	2383	2343
Concrete Inc (ERC) ¹	Sacramento	76	90	94	87
Rancho Seco (ERC)	Sacramento	1721	820	423	858
Road Paving (ERC) ¹	Sacramento	1516	2538	2942	2196
Total ERC		16606	16454	17375	16231
Additional ERC Needed		22274	22858	22369	23513
Offsets Adequate?		No	No	No	No

Note: All emission reduction credits have been adjusted with the appropriate distance factor (between 1.0 to 1.5) as required by the District NSR Rule (rule 202).

¹ After taking adjustment for PM_{2.5} portion.

ADEQUACY OF PROPOSED MITIGATION MEASURES

CONSTRUCTION PHASE MITIGATION

As mentioned earlier in the impact section, the construction of the project would cause PM₁₀ emissions that will add to the existing violations of the ambient PM₁₀ air quality standard. Therefore, the project PM₁₀ emission impacts due to construction of the project are significant. In addition to the applicant-proposed construction mitigation measures, staff recommends the following mitigation measures to minimize the PM₁₀ impacts to less than significant level.

- Apply twice daily the water application to unpaved surface travel and unpaved parking areas.
- Provide gravel pads along with wheel washer to all trucks exiting the construction site to any paved roadway.

- Provide, twice daily, vacuum sweeping of the construction site's adjacent paved roads, and paved parking areas.
- Post a sign and enforce traffic speed on the unpaved surface of the construction site to no more than 10 mile per hour.
- Limiting engine idle time to no more than 15 minutes.
- Conduct a feasibility analysis of electrifying small construction equipment.

OPERATIONAL PHASE MITIGATION

Air Contaminant Abatement System

The project NO_x, VOC, SO₂, PM₁₀ and ammonia emissions have the potential to contribute to the existing violations of the area ozone and PM₁₀ air quality standards. Therefore, minimizing the emissions from the equipment will lessen the impacts on air quality from the proposed project.

The applicant proposes to limit the turbine/HRSG power trains NO_x emissions to 2.5 ppm using the SCR system, which has a 10 ppm ammonia slip. The applicant has not received a written guarantee from a vendor because they have not yet selected a vendor. Staff believes that an SCR system that can achieve a 2 ppm NO_x and 5 ppm ammonia slip is technically and economically feasible. To lessen the secondary PM₁₀ emissions (ammonium nitrate and ammonium sulfate) to the atmosphere, staff recommends that the selected SCR system meet the 2 ppm NO_x and 5 ppm (or less) ammonia slip.

The EPA staff has provided several letters stating that a BACT for a turbine using SCR technology should be 2 ppm for NO_x and 5 ppm ammonia slip. The Bay Area Air Quality Management District is proposing to lower the BACT for turbine NO_x emissions from the current level of 2.5 ppm, to 2 ppm (East Altamont Energy Center). In addition, the District has proposed in the draft PDOC that this project's turbine NO_x emissions to be maintained at 2 ppm on an hourly basis. These requirements are consistent with the above staff recommendation.

The applicant has proposed that the turbine/HRSG power train emissions of VOC and CO to be maintained at 2 ppm and 6 ppm, respectively. The applicant has stated that it will leave space in the HRSG to fit an oxidation catalyst, which controls the gas turbines' VOC and CO emissions (similar to those found in cars), in case the turbine/HRSG power train emissions cannot meet their proposed emission concentrations.

Offsets

Ozone Precursors

The District (in the draft PDOC) recommends that the surplus VOC emissions reduction credits (see **Air Quality Table 7**) be used to inter-pollutant offset the project NO_x emissions at the District determined ratio of 2.6 pounds of VOC for each new pound of NO_x emissions.

As mentioned in the **Setting** section, staff believes that the project NO_x emissions should be mitigated with NO_x emission reductions that are generated from the local area because the ambient ozone levels are dependent on NO_x emissions rather than VOC emissions. As a result, staff does not believe that the inter-pollutant trade-off ratio (2.6:1) is sufficient to mitigate the project impact on ozone concentration in the area due to the abundance of VOC in the atmosphere (see **Setting** section). Staff also believes that the use of emission offsets, including any inter-pollutant offsets, should provide direct mitigation of the project's impacts to the area's ambient air quality.

Staff also notes that the applicant has not provided a written approval from the EPA for the use of inter-pollutant offsets.

Staff recommends that approximately 29,000 additional lbs. (see **Air Quality Table 6**) of NO_x emission reduction credits, in the local area, and in the third quarter, be secured to adequately mitigate the project impacts. Staff bases this recommendation upon the following observations:

- The ozone violations in the area typically occur during the third quarter (June to August), and
- The project is not expected to cause a new violation of the area ozone standard in other months of the year.

Staff believes that the emission reductions in this quarter would most effectively mitigate the project contribution to the area's ozone violations.

PM₁₀

SMUD has provided emission reduction credits of 81.6 TPY of PM₁₀ to partially offset the emissions from the project. Of this 81.6 TPY of emission credits, 51.1 TPY are recently approved by the District for paving various unpaved roadways in the area. These roads are Beskeen, Laguna, Angrave, Angle, Jaeger, Magos, Loll, and Kiefer. The nearest of these roads is located approximately 2.5 miles from the project site. The remaining PM₁₀ emissions, estimated by the District to be approximately 3.3 TPY, is proposed to be offset with SO₂ emission reduction credits at a ratio that ranges from 3.3:1 in the fourth quarter of year to 1.7:1 in the second and third quarters.

Staff believes that the emission reduction credits can be used effectively in the mitigation of the project PM₁₀ emissions. However, staff has serious reservations about

the use of the road dust emission reduction credits to mitigate the project's impact on the PM₁₀ air quality standard. They are:

- PM₁₀ emissions generated from a combustion source, such as the project gas turbines, are mostly, if not all, in the form of fine particulate matter with an average aerodynamic diameter of 2.5 microns or less (PM_{2.5}). These are the kind of particles that can reach deep into the lung and stay trapped; thus, if these particles are composed of any toxic substance, the health effects are very pronounced.
- The road dust particles are mostly in the coarse range (those that have an average aerodynamic diameter of 10 microns or less), and only 3 to 15 percent particles (EPA AP-42, Section 13.2.2, and ARB Emission Inventory staff) are in the range of 2.5 microns or less.
- Most of the road dust particles (PM₁₀) are likely to settle within 100 yards of the sources, and a portion of these road dust particles, most likely to be fine particles (PM_{2.5}) can stay suspended in the atmosphere (Central Regional Particulate Air Quality Study, December 20, 1998). The portions of these fine particles (PM_{2.5}) can be used to mitigate the project's PM₁₀ contribution to the violations in the area.

The ARB has also expressed serious concerns about the use of road dust emission reductions to offset the PM₁₀ emissions from combustion sources (June 19, 2000 ARB Memorandum to the California Air Pollution Control Officer Association). ARB recommends that emission reduction credits generated from road dust should only be used for permitting of new sources that generate particulate matter from similar activity.

Staff recommends that the emission reduction credits from road paving be adjusted for the PM_{2.5} portion prior to its use as offset. Taking an average 9 percent of PM_{2.5} in road dust, the emission reduction credits from road paving should be adjusted to 4.6 TPY (from 51.1 TPY), which can be used to mitigate part of the project PM₁₀ emission impacts. Thus, the project is facing a shortfall of approximately 45.5 TPY of PM₁₀ emission reduction credits (See **Air Quality Table 8**).

Staff recommends that approximately 22,000 additional lbs of PM₁₀ emission reduction credits, in the local area, and in the three months of December to February, (see **Air Quality Table 8**) be secured to provide adequate mitigation to the project impacts. Staff based the recommendation upon the following observations:

- The PM₁₀ violations most typically occurred in the three months, December to February, of the year, and
- The project is not expect to cause a new violation of the area PM₁₀ standard in other months of the year.

Staff believes that the emission reductions in this quarter would most effectively mitigate the project contribution to the area's PM₁₀ violations.

SO_x

The applicant provided an estimate of the project SO₂ emissions using a natural gas fuel that has a sulfur content of 0.25 gr/100scf. This estimate shows that the project

SO₂ emissions are below the District requirement for emission offsets. Therefore, SMUD has not proposed to mitigate any SO₂ emissions from the project.

Staff has serious concerns that the project SO₂ emissions, which are a precursor to PM₁₀, if not mitigated, will contribute to the existing violations of the state 24-hour PM₁₀. Therefore, the project SO₂ emission impacts on PM₁₀ air quality standard in the area is significant without proper mitigation.

Aside from the mitigation issue discussed above, the District New Source Review Rule 202, Section 302, requires an applicant to provide SO₂ emission reductions as offsets if the cumulative emissions of the stationary source exceed 13,650 lbs. per calendar quarter. Sections 414 to 418 state that the calculations of the emission offset trigger level must be based on the potential to emit of a stationary source or permit unit. Section 227 defines the potential to emit as "The maximum physical and operational design capacity to emit a pollutant."

The applicant has a summary of the hourly sulfur content measurements for an entire year (most recently as 2000), which indicates that the annual average sulfur content of natural gas is approximately 0.28 gr/100scf, and the sulfur can be as high as 0.49 gr/100scf. These data indicate that the assumed sulfur content used by the applicant is underestimated.

Natural gas being delivered to the facility can contain sulfur as high as 1 gr/100scf, which is four times higher than SMUD has assumed in the calculations of the facility SO₂ emissions. According to the District NSR rule, the facility SO₂ emissions should be evaluated based on a potential to emit (see above) of 1 gr/100scf. Using this natural gas' sulfur concentration, the facility SO₂ emissions for Phase I alone would be approximately 21,000 lbs/quarter, which exceed the 13,500 lbs/quarter offset threshold. Therefore, SO₂ emissions would trigger the need for emission offsets. Staff will work with the District staff to resolve this issue, and will provide additional discussions in the staff's Final Staff Assessment.

To ensure continuous compliance with the project's expected SO_x emissions, staff recommends that the project SO₂ emissions be re-evaluated with the 1gr./100 scf, and that the project's first quarter portion of SO₂ emissions be mitigated with SO₂ emissions that SMUD already owns. At the very least, the project's SO_x emissions should be evaluated with the average natural gas sulfur concentration of 0.28 gr./100 scf and be mitigated. Because SO_x is a precursor to PM₁₀, and for similar reasons discussed in the PM₁₀ offsets section above; staff has estimated (using the 0.28 gr./100scf sulfur concentration), and recommends SMUD to provide approximately 6,000 lbs of SO_x emission reduction credits in the three months, December to February, to mitigate the project impacts.

Air Quality Table 9
Staff's Recommended Additional Emission Reduction Credits

Air Contaminants	Quantity	Timing	Preferred Location
NO _x	14.5 tons	between June and	Elk-Grove, Sloughouse,

		August	or Folsom
PM ₁₀	11 tons	between December and February	Elk-Grove, Sloughhouse
SO _x	3 tons	between December and February	Elk-Grove, Sloughhouse

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the non-white population is less than fifty percent within a six-mile radius of the proposed Cosumnes Power facility, and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. However, there are two census blocks in the south and southeast, and one census block in the northwest of the project site, which contain more than fifty percent non-white members. Staff will provide additional analysis in the Final Staff Assessment to verify whether a disproportional impact to the minority in the affected location can occur.

COMPLIANCE WITH LORS

FEDERAL

The applicant has submitted to the District an application for the federal PSD permit. The District has not issued a Preliminary Determination of Compliance (PDOC). However, a draft PDOC was completed by the air district. Staff has reviewed and analyzed the draft PDOC.

The applicant is also required to submit an application to the District for a Major Facility Review Permit (Title V) prior to commencing operation. The applicant is also restricted from commencing operation unless a Title IV Permit has been issued, or 24 months after submitting an acid rain application (Title IV) to the District, whichever is earlier. Compliance with both of these federal titles will be determined at a later date (see the following Conclusions and Recommendations sections).

The EPA staff has provided comments about another energy facility (Morro Bay-00-AFC-12), which call for lower limits for NO_x (2 ppm), ammonia slip (5 ppm), and CO (2 ppm). The EPA has made similar comments regarding a proposed cogeneration facility at the Miller Brewing Company in the South Coast Air Quality Management District, stating that the BACT analysis must start with a 2 ppm level for both NO_x and CO. The applicant is aware of the EPA's comments and will respond to them if EPA makes similar comments in this case. Staff will work with the EPA staff to resolve these issues prior to the issuance of the staff FSA (see the following Conclusions and Recommendations sections).

STATE

As discussed earlier and summarized below, the project, without proper mitigation, has the potential to cause significant ozone and particulate matter impacts.

LOCAL

The District has not issued a PDOC, thus staff will work with the District and will provide discussions of the project's compliance with the District's Rules and Regulations requirements in the FSA.

CONCLUSIONS

As proposed by SMUD, the project may not meet the Federal PSD BACT requirement for NO_x, NH₃, and CO emissions.

Staff believes that even after consideration of the offsets provided in accordance with district rules, there may remain an unmitigated adverse impact to the local area near the proposed plant. To offset this probable adverse impact, staff believes that an additional amount of offsets are necessary to reduce these impacts. SMUD should provide additional offsets noted below in the recommendations.

- The project's potential contribution to violations of the state and the federal 1-hour ozone air quality standards may cause a significant impact.
- The project's potential to contribute to violations of the state 24-hour PM₁₀ and the federal 24-hour PM_{2.5} air quality standards may cause a significant impact.
- The proposed emission reduction credits are not adequate to mitigate the project's potential significant impacts to the state and the federal ozone and PM₁₀ air quality standards.

RECOMMENDATIONS

Staff cannot recommend licensing the proposed Cosumnes Power Plant unless the applicant provides sufficient evidence to demonstrate that the project would conform with all applicable air quality laws, and that emission reductions would be provided in sufficient quantities to mitigate the project's impacts to a level of less than significant. Below is a list of items to be provided by the applicant, or issues, which staff will commit to resolve with the applicant and the District, prior to filing the staff Final Staff Assessment:

- Written or oral confirmation from EPA that the project's proposed emission limits will meet the federal BACT.
- Written correspondence from EPA that the use of inter-pollutant offsets is acceptable.
- Written correspondence from the District that the project can fully comply with Rule 202, Section 304, i.e., the project will not cause a new violation or contribute to the

existing violations of the ambient air quality standards. This could be in the form of the Preliminary or the Final DOC.

- An agreement to limit the ammonia slip from the SCR system to no more than 5 ppm to lessen the potential impacts of the project on the area PM₁₀ and PM_{2.5} ambient air quality standards.
- A revised SO₂ emissions calculation using a reasonable expected sulfur compounds grain loading of 0.28 grain/100 scf natural gas.
- An agreement to provide 29,000 lbs of third quarter NO_x ERC, 22,000 lbs PM₁₀ ERC that are generated in the three months December to February, and 6,000 lbs SO_x ERC that are generated in the three months of December to February to mitigate the project's impacts (to mitigate the local air quality impacts noted in the conclusions, SMUD should provide these additional offsets).

Staff provides the following Conditions of Certification. The conditions identified as AQ-C1 through AQ-C5, and AQ-1 are Energy Commission staff recommended conditions. The remaining conditions 1 to 36 are conditions prepared by the District as included in their Draft Preliminary Determination of Compliance. These conditions are included for discussion purposes to receive comments and suggested edits. These conditions do not imply that staff has recommended, or will recommend the construction and operation of the Cosumnes Power Plant at this time. These conditions can also be significantly revised to reflect new information from the applicant and the District Preliminary Determination of Compliance.

CONSTRUCTION CONDITIONS OF CERTIFICATION

AQ-C1 The project owner/operator shall submit the resume(s) of each individual proposed to fill the Construction Mitigation Manager (CMM) position to the CEC Compliance Project Manager (CPM) for approval. One or more individuals may hold this position. The owner/operator shall be responsible for funding the costs of the CMM, however the CMM shall report directly to the CPM. The CMM shall preferably have a minimum of 8 years experience as follows, however the CPM shall consider all resumes submitted regardless of experience:

- 5 years construction experience as a subcontractor or general contractor.
- An engineering degree or an additional 5 years construction experience.
- 1 year construction project management experience.
- 2 years air quality assessment experience.

The project owner/operator shall make available a dedicated office for the CMM. The CMM shall be responsible for implementing all mitigation measures related to construction equipment combustion emissions,

construction monitoring and enforcing the effectiveness of construction mitigation measures as outlined in Conditions of Certification **AQ-C3**, **AQ-C4**, and **AQ-C5**. The CMM shall be onsite during all construction activities, until no longer deemed necessary by the CPM. The CMM shall be granted access to all areas of the main and linear facility construction sites. The CMM shall have the authority to stop specific construction activities on either the main or the linear facility construction sites as specified in Condition AQ-C3 (3) below. The CMM may not be terminated prior to the cessation of construction activities unless approval is granted by the CPM.

Verification: The project owner/operator shall submit the CMM resume(s) to the CPM for approval at least sixty (60) days prior to site mobilization.

AQ-C2 The CMM shall submit to the CPM for approval, a Monthly Construction Compliance Report (MCCR). The MCCR will, at a minimum, summarize all compliance actions taken germane to Conditions of Certification **AQ-C3**, **AQ-C4** and **AQ-C5**. The MCCR shall include, at a minimum, the following elements:

**Fugitive Dust Mitigation Monthly Report
(see Condition of Certification AQ-C3 and AQ-C5)**

- A summary of each of the operation(s) planned for the following two months which may result in the generation of fugitive dust. Each description shall include a schedule, on-site location details and a list of proposed fugitive dust mitigation measures.
- A summary report of all mitigation activities implemented for each fugitive dust generating operation identified in a previous MCCR. This report should provide a summary description of the operation, the mitigation measures implemented and the estimated effectiveness of each mitigation measure.
- Detailed reports of all operation(s) requiring fugitive dust mitigation that were not identified in the previous MCCR or the FDMP. This report should include (at a minimum) a description of the operation, the date, duration, mitigation measures implemented, and an explanation for not reporting the operation in a previous MCCR (or in the FDMP).
- Identification of any failures of mitigation measures and a detailed report of the actions taken to reduce the identified impacts and prevent future failures of those mitigation measures.
- Identification of any observation by the CMM of dust plumes beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) were taken to abate the plume.

- A summary report of all ambient air monitoring data collected.

**Diesel Construction Equipment Mitigation Monthly Report
(see Condition of Certification AQ-C4)**

- Identification of any changes, as approved by the CPM, to the Diesel Construction Equipment Mitigation Plan from the initial report or the last monthly report including any new contractors and their diesel construction equipment.
- A Copy of all receipts or other documentation indicating types and amounts of fuel purchased, from whom, where delivered and on what date for the main and related linear construction sites.
- Identification and verification of all diesel engines required to meet EPA or CARB 1996 off-road diesel equipment emission standards.
- The suitability of the use of a catalyzed diesel particulate filter for a specific piece of construction equipment is to be determined by a qualified mechanic or engineer who must submit a report through the CMM to the CPM for approval. The identification of any suitability report initiated or pursued, or the completed report, should be included in the monthly report (in the month that it was completed) as should the verification of any subsequent installation of a catalyzed diesel particulate filter.
- Identification of any observation by the CMM of exhaust plumes emanating from diesel-fired construction equipment beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) were taken to abate the plume or future expected plumes.

Verification: The CMM shall submit to the CPM for approval, the Monthly Construction Compliance Report (MCCR) for each month by the 15th (or the following Monday if the 15th is a Saturday or Sunday) of the following month while construction is occurring at the main or related linear construction sites.

AQ-C3 The CMM shall prepare and submit to the CPM for approval a Fugitive Dust Mitigation Plan (FDMP) that specifically identifies all fugitive dust mitigation measures that will be employed during the construction of the facility. The FDMP shall be administered on site by the full-time CMM.

The FDMP shall include a schedule of each operation planned for the first two months of the project that may result in the generation of fugitive dust, including location, source(s) of fugitive dust, and proposed mitigation measures specific to each operation/source.

The construction mitigation measures that shall be addressed in the FDMP include, but are not limited to, the following:

- Identification of the employee parking area(s) and surface composition of those parking area(s)
- The frequency of watering of unpaved roads and all disturbed areas
- Application of chemical dust suppressants
- Gravel in high traffic areas
- Paved access aprons
- Sandbags to prevent run off
- Posted speed limit signs
- Wheel washing areas prior to large trucks leaving the project site
- Methods that will be used to clean tracked-out mud and dirt from the project site onto public roads
- For any transportation of solid bulk material
 1. Vehicle covers
 2. Wetting of the transported material
 3. Appropriate freeboard
- Methods for the stabilization of storage piles and disturbed areas
- Windbreaks at appropriate locations
- Additional mitigation measures to be implemented at the direction of the CMM in the event that the standard measures fail to completely control dust from any activity and/or source
- The suspension of all earth moving activities under windy conditions
- On-site monitoring devices

In monitoring the effectiveness of all mitigation measures included in the FDMP, the CMM shall take into account the following, at a minimum:

- Onsite spot checks of soil moisture content at locations where soil disturbance, movement and/or storage is occurring;
- Visual observations of all construction activities; and

- The results of measurements by portable PM₁₀ instruments (as described in **AQ-C5**).

The CMM shall implement the following procedures for additional mitigation measures if the CMM determines that the existing mitigation measures are not resulting in effective mitigation:

- The CMM shall direct more aggressive application of the existing mitigation methods within fifteen (15) minutes of making such a determination.
- The CMM shall direct implementation of additional methods of dust suppression if step #1 specified above fails to result in adequate mitigation within thirty (30) minutes of the original determination.
- The CMM shall direct a temporary shutdown of the source of the emissions if step #2 specified above fails to result in adequate mitigation within one (1) hour of the original determination. The activity shall not restart until one (1) full hour after the shutdown. The owner/operator may appeal to the CPM any directive from the CMM to shutdown a source, provided that the shutdown shall go into effect within one (1) hour of the original determination unless overruled by the CPM before that time.

Verification: At least thirty (30) days prior to site mobilization, the project owner/operator shall provide the CPM with a copy of the Fugitive Dust Mitigation Plan (FDMP) for approval. Site mobilization shall not commence until the project owner/operator receives approval of the FDMP from the CPM.

AQ-C4 The CMM shall prepare and submit to the CPM for approval a Diesel Construction Equipment Mitigation Plan (DCEMP) that will specifically identify diesel engine mitigation measures that will be employed during the construction phase of the main and related linear construction sites. The CMM will be responsible for directing implementation of and compliance with all measures identified in the DCEMP. The DCEMP shall address, at a minimum, the following mitigation measures:

- Catalyzed diesel particulate filters (CDPF)
- CARB certified ultra low sulfur diesel fuel, containing 15ppm sulfur or less (ULSD)
- Diesel engines certified to meet EPA and/or CARB 1996 or better off-road equipment emission standards
- Restricting diesel engine idle time, to the extent practical, to no more than 10 minutes

The Diesel Construction Equipment Mitigation Plan shall include the following:

- 1.) A list of all diesel-fueled, off-road, stationary or portable construction-related equipment to be used either on the main or the related linear construction sites. This list will initially be estimated and then subsequently be updated as specific contractors become identified. Prior to a contractor gaining access to the main or related linear construction sites, the CMM will submit to the CPM for approval, an update of this list including all of the new contractor's diesel construction equipment.
- 2.) Each piece of construction equipment listed under item #1 of this condition must demonstrate compliance according to the following mitigation requirements, except as noted in items #3, #4 and #5 of this condition:

Engine Size (BHP)	1996 CARB or EPA Certified Engine	Required Mitigation
< 100	NA	ULSD
> or = 100	Yes	ULSD
> or = 100	No	ULSD and CDPF, if suitable as determined by the CMM

1. If the construction equipment is intended to be on-site for ten (10) days or less, then none of the mitigation measures identified in item #2 of this condition are required.
2. The CPM may grant relief from the mitigation measures listed in item #2 of this condition for a specific piece of equipment if the CMM can demonstrate that they have made a good faith effort to comply with the mitigation measures and that compliance is not possible.
3. Any implemented mitigation measure in item #2 of this condition may be terminated immediately if one of the following conditions exists, however the CPM must be informed within ten (10) working days of the termination:
 - 5.1 The measure is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in back pressure.
 - 5.2 The measure is causing or is reasonably expected to cause significant engine damage.
 - 5.3 The measure is causing or is reasonably expected to cause a significant risk to workers or the public.
 - 5.4 Any other seriously detrimental cause which has approval by the CPM prior to the termination being implemented.

4. All contractors must agree to limit diesel engine idle time on all diesel-powered equipment to no more than ten (10) minutes, to the extent practical.

Verification: The CMM shall submit the initial Diesel Construction Equipment Mitigation Plan (DCEMP) to the CPM for approval at least thirty (30) days prior to site mobilization. The CMM will update the initial DCEMP as necessary, no less than ten (10) days prior to a specific contractor gaining access to either the main or related linear construction sites. The CMM will notify the CPM of any emergency termination within ten (10) working days of the termination.

CONSTRUCTION AND OPERATION CONDITION OF CERTIFICATION

AQ-1 The project owner shall submit to the CPM for review and approval any modification proposed by either the project owner or issuing agency to any project air permit.

Verification: The project owner shall submit the proposed air permit modification to the CPM within five (5) working days of its submittal by the project owner to an agency or receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within fifteen (15) days of their receipt.

DISTRICT PROPOSED CONDITIONS

GENERAL

1. The equipment shall be properly maintained.
2. The Air Pollution Control Officer and/or authorized representatives, upon the presentation of credentials, shall be permitted:
 - A. To enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this permit to operate, and
 - B. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit to operate, and
 - C. To inspect any equipment, operation, or method required in this permit to operate, and
 - D. To sample emissions from the source or require samples to be taken.
3. This permit does not authorize the emission of air contaminants in excess of those allowed by Division 26, Part 4, Chapter 3, of the California Health and Safety Code or the rules and regulations of the Air Quality Management District.
4. A legible copy of this permit shall be maintained on the premises with the equipment.
5. Malfunction - the Air Pollution Control Officer shall be notified of any breakdown of the emissions monitoring equipment, any equipment, or any process which results in an increase in emissions above the allowable emissions limits stated as a

condition of this permit or any applicable state or federal regulation or which affects the ability for the emissions to be accurately determined. Such breakdowns shall be reported to the District in accordance with the procedures and reporting times specified in Rule 602 - Breakdown Conditions; Emergency Variance.

6. Severability - if any provision, clause, sentence, paragraph, section, or part of these conditions for any reason is judged to be unconstitutional or invalid, such judgement shall not affect or invalidate the remainder of these conditions

COMMISSIONING ACTIVITIES

7. The owner/operator of the CPP combustion gas turbines #1 and #2 (CTG's #1 & #2) shall minimize emissions of carbon monoxide and nitrogen oxides to the maximum extent possible during the commissioning period. Conditions 7 through 15 will only apply during the commissioning period. The commissioning period is defined as, "The Period shall commence when all mechanical, electrical, and control systems are installed and individual start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The Period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange.
8. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufactures and the construction contractor, the gas turbine combustors of CTG's #1 & #2 shall be tuned to minimize the emissions of carbon monoxide and nitrogen oxides.
9. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufactures and the construction contractor, the Selective Catalytic Reduction (SCR) systems #1 & #2 shall be installed, adjusted, and operated to minimize the emissions of nitrogen oxides from CTG's #1 & #2.
10. The owner/operator of the CPP shall submit a plan to the District and the CEC CPM at least 4 weeks prior to first firing of CTG's #1 & #2 describing the procedures to be followed during the commissioning of the gas turbines and HRSGs. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not limited to, the tuning of the dry-low-NO_x combustors, the installation and operation of the SCR systems, the installation, calibration, and testing of the NO_x, CO and O₂ continuous emission monitors, and any activities requiring the firing of the CTG's #1 & #2 without abatement by their respective SCR systems.
11. During the commissioning period, the owner/operator of CTG's #1 & #2 shall demonstrate compliance with conditions 13 through 16 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
 - Firing hours for each CTG
 - Fuel flow rates to each CTG
 - Stack gas nitrogen oxide emission concentrations of each CTG

Stack gas carbon monoxide emission concentrations of each CTG

Stack gas oxygen concentrations of each CTG

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the CTG's #1 & #2. The owner/operator shall use District approved methods to calculate heat input rates, NO_x mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.

12. The District approved continuous emission monitors specified in condition 10 shall be installed, calibrated, and operational prior to first firing of the CTG's #1 & #2. After first firing of the turbines, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of NO_x and CO emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
13. The total number of firing hours of each CTG without abatement of nitrogen oxide emissions by SCR systems #1 & #2 shall not exceed 400 hours during the commissioning period. Such operation of CTG's #1 & #2 shall be limited to discrete commissioning activities that can only be properly executed without the SCR systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District and the unused balance of the 400 firing hours without abatement shall expire.
14. The total mass emissions of nitrogen oxides, carbon monoxide, reactive organic compounds, sulfur oxides, and PM₁₀ that are emitted by the CTG's #1 & #2 during the commissioning period shall accrue towards the quarterly emission limitations specified in condition 19.
15. Combined pollutant mass emissions from CTG's #1 & #2 shall not exceed the following limits during the commissioning period.

Maximum Allowable Emissions During the Commissioning Period Including Start-ups and Shutdowns.		
Pollutant	Lb/hr	Lb/day
NO _x	142	2,095
CO	410	7,844
ROC		159
SO _x		48
PM ₁₀		324

Note: Hourly limits for NO_x and CO will be monitored using CEMS.

EMISSION LIMITS

16. The equipment shall not discharge into the atmosphere any visible air contaminant other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour, which is Ringelmann No. 1 or greater.

17. Emissions from the following equipment shall not exceed the following limits, not including periods containing start-ups and short-term excursions as defined in condition 25.

Pollutant	Maximum Allowable Emissions	
	CTG #1 (lb/hr)	CTG #2 (lb/hr)
NOx	13.51 (a)	13.51 (a)
CO	16.46 (b)	16.46 (b)
ROC	3.30 (c)	3.30 (c)
SOx	1.31 (d)	1.31 (d)
PM ₁₀	9.00 (e)	9.00 (e)

(A) Based on data submitted in the application and is monitored by the turbine's NOx CEM system (1 hour average).

(B) Based on data submitted in the application and is monitored by the turbine's CO CEM system (3 hour average)

(C) Based on a turbine ROC emission factor of 0.00177 lb/mmbtu and firing at full capacity.

(D) Based on a turbine SOx emission factor of 0.71 lb/mmscf and firing at full capacity.

(E) Based on a turbine PM10 emission factor of 0.00483 lb/mmbtu and firing at full capacity.

18. Emissions of NOx, CO, ROC, SOx, and PM10 from Phase I at the CPP facility including start-ups and shut-downs shall not exceed the following limits.

Pollutant	Maximum Allowable Emissions (lb/day)			
	CTG #1	CTG #2	Cooling Tower	Total
NOx	523.7	523.7	NA	1,047.4
CO	3,051.7	3,051.7	NA	6,103.3
ROC	117.3	117.3	NA	234.6
SOx	31.4	31.4	NA	62.9
PM10	216.0	216.0	3.6	435.6

19. Emissions of NOx, CO, ROC, SOx, and PM10 from all Phase I at the CPP facility including start-ups and shut-downs shall not exceed the following limits.

Pollutant	Maximum allowable emissions				
	Qtr 1 (lb/quarter)	Qtr 2 (lb/quarter)	Qtr 3 (lb/quarter)	Qtr 4 (lb/quarter)	Total (lb/year)
NOx	62,021	62,643	63,265	63,265	251,194
CO	147,929	148,687	149,444	149,444	595,505
ROC	14,807	14,958	15,110	15,110	59,986
SOx	5,405	5,465	5,525	5,525	21,922
PM10	36,204	39,640	40,075	40,075	158,994

20. Each combined cycle combustion turbine shall not emit more than 2 ppmvd NO_x at 15% O₂, averaged over any one hour period, excluding periods containing start-ups/shut-downs and short term excursions as defined in condition 25.
21. Each combined cycle combustion turbine shall not emit more than 4 ppmvd CO at 15% O₂, averaged over any consecutive three hour period, excluding periods containing start-ups/shut-downs and short term excursions as defined in condition 25.
22. Each combined cycle combustion turbine shall not emit more than 10 ppmvd ammonia at 15% O₂, measured as NH₃, averaged over any consecutive three hour period, excluding start-ups/shut-downs as defined in condition 25.
23. The total dissolved solids content of the circulating cooling water shall not exceed 470 ppmw, averaged over any consecutive three hour period.

EQUIPMENT OPERATION

24. Each combined cycle turbine shall not be operated without a functioning selective catalytic reduction air pollution control system, excluding periods of start-ups and shut-downs.
25. The duration of each combined cycle turbine's start-up period shall not exceed 180 minutes. Start-ups are defined as time periods commencing with the introduction of fuel to the gas turbine, and ending at the time that 15-minute average NO_x and CO concentrations do not exceed 2 ppmvd and 4 ppmvd respectively, but in no case exceeding 180 consecutive minutes.

Short-term excursions (TO BE DETERMINED LATER)

All emissions during start-ups/shut-downs and short-term excursions shall be included in all calculations of daily, quarterly and annual mass emissions required by this permit.

26. The cooling towers shall not use any chromium-containing water treatment chemicals.
27. The cooling tower drift rate shall not exceed 0.0005%. The applicant shall provide a written vendor statement, prior to installation, declaring that the cooling towers mist eliminators used meet the drift criteria stated above.

NEW SOURCE PERFORMANCE STANDARDS COMPLIANCE

28. The applicant shall provide written notification to the Air Pollution Control Officer for the following:
 - a. The date construction is commenced postmarked no later than 30 days after such date.
 - b. The anticipated date of initial start-up of the plant not more than 60 days nor less than 30 days prior to such date.
 - c. The actual date of initial start-up of the plant within 15 days after such date.
 - d. A notification of any physical or operational change to the facility which may increase the emission rate to which a standard applies except exempted modifications as defined in 40 CFR 60.14(e), postmarked 60 days or as soon as practicable before the change is commenced.
 - e. The date upon which the demonstration of the continuous monitoring system performance commences postmarked not less than 30 days prior to such date.
29. The following tests, reports and conditions shall be met:

- a. Within 60 days of achieving the maximum production rate but no later than 180 days after initial start-up the owner or operator will conduct performance test(s) as per Condition 34 and furnish the Air Pollution Control Officer a written report of the results of such performance test(s).
- b. The owner or operator shall provide the Air Pollution Control Officer 30 days prior notice of the performance test(s).

MONITORING SYSTEMS

30. The CPP shall operate a continuous emission monitoring system that has been approved by the Air Pollution Control Officer for each combined cycle turbine's emissions.
 - A. The continuous emission monitoring (CEM) system shall monitor and record nitrogen oxides, carbon monoxide, and oxygen.
 - B. The CEM system shall comply with the EPA performance specifications (title 40, Code of Federal Regulations, Part 60, Appendix B, Performance Specifications 2, 3, and 4).
31. The CPP shall operate a continuous monitoring system that has been approved by the Air Pollution Control officer that either measures or calculates and records the following.

Parameter to be monitored	Units
Fuel consumption of each combined cycle turbine	Mmbtu/hr of natural gas
Exhaust gas flow rate of turbine and duct burner.	Kscfh or lb/hr
Total dissolved solids content of the circulating water in the cooling towers.	PPMW

RECORD KEEPING

32. The following record shall be continuously maintained on site for the most recent five year period and shall be made available to the Air Pollution Control Officer upon request. Quarterly and yearly records shall be made available for inspection within 30 days of the end of the previous quarter or year respectively.

Frequency	Information to be recorded
General	<ol style="list-style-type: none"> A. Record of the occurrence and duration of any start-up, short-term excursion, or shut-down. B. Malfunction in operation of each turbine. C. Measurements from the continuous monitoring system. D. Monitoring device and performance testing measurements. E. All continuous monitoring system performance evaluations. F. All continuous monitoring system or monitoring device calibration checks G. All continuous monitoring system adjustments and maintenance.
Hourly	<ol style="list-style-type: none"> A. Each combined cycle turbine's natural gas fuel consumption (mmbtu/hr). B. Indicate when each combined cycle turbine start-up/shut-down occurred. C. Each combined cycle turbine's NO_x, CO, ROC, SO_x

	<p>and PM10 hourly emissions. For those pollutants directly monitored (NOx and CO), the hourly emissions will be from the CEM system required pursuant to condition 25. For those pollutants that are not directly monitored (ROC, SOx, and PM10), the hourly emissions shall be calculated based on District approved emission factors contained in footnotes to condition 17.</p> <p>D. Each combined cycle turbine's NOx and CO concentration measured in ppmvd at 15% O₂.</p> <p>E. Total dissolved solids content of the circulating water in the cooling towers in ppmw.</p> <p>F. Cooling tower hourly PM10 mass emission rate. The hourly emissions shall be calculated based on the cooling water circulation rate multiplied by the cooling tower drift rate, density of water, and the measured TDS level.</p>
Daily	Total facility NOx, CO, ROC, SOx, and PM10 daily mass emissions.
Quarterly	Total facility NOx, CO, ROC, SOx, and PM10 quarterly mass emissions.

REPORTING

33. For each calendar quarter submit to the Air Pollution Control Officer a written report which contains the following. Each quarterly report is due by the 30th day following the end of the calendar quarter.

Frequency	Information to be submitted
Whenever the continuous emissions monitoring system is inoperative except for zero and span checks.	<p>A. Date and time of non operation of the continuous emission monitoring system</p> <p>B. Nature of the continuous emission monitoring system repairs or adjustments.</p>
Whenever an emission occurs as measured by the required continuous monitoring equipment that is in excess of any emission limitation	<p>A. Magnitude of the emission which has been determined to be in excess.</p> <p>B. Date and time of the commencement and completion of each period of excess emissions</p> <p>C. Periods of excess emissions due to start-up, shut-down, short-term excursion, and malfunction shall be specifically identified.</p> <p>D. The nature and cause of any malfunction (if known)</p> <p>E. The corrective action taken or preventive measures adopted.</p>
If there were no excess emissions for a quarter	A report shall be submitted indicating that there were no excess emissions

COMPLIANCE TESTING REQUIREMENTS

34. A NOx, ROC, CO, PM10, ammonia, and CEM accuracy source test of each combined cycle turbine shall be performed during the time frame pursuant to Condition 29.

- A. Submit a test plan to the Air Pollution Control Officer for approval at least 30 days before the source test is to be performed.
 - B. The Air Pollution Control Officer shall be notified at least 7 days prior to the emission testing date.
 - C. During the test(s), each turbine is to be operated at it's maximum total firing capacity.
 - D. The source test results shall be submitted to the Air Pollution Control Officer within 60 days from the completion of the source test(s).
35. A NO_x, ROC, CO, PM₁₀, ammonia, and CEM accuracy source test of each combined cycle turbine shall be performed once each calendar year. The Air Pollution Control Officer may waive the annual PM₁₀ and/or ROC source test requirement if, in the Air Pollution Control Officer's sole judgement, prior test results indicate an adequate compliance margin has been maintained.
- A. Submit a test plan to the Air Pollution Control Officer for approval at least 30 days before the source test is to be performed.
 - B. The Air Pollution Control Officer shall be notified at least 7 days prior to the emission testing date.
 - C. During the test(s), each turbine is to be operated at it's maximum total firing capacity.
 - D. The source test results shall be submitted to the Air Pollution Control Officer within 60 days from the completion of the source test(s).

EMISSION REDUCTION CREDITS

36. Prior to construction of the CPP, the applicant shall provide the District emission reduction credit certificates in sufficient quantity to show compliance with the quarterly emission limits by the use of the following calculation procedure.

$$QTR_q = \frac{P_{q \leq 15}}{1.3} + \frac{P_{q > 15}}{1.5}$$

- P_q = Emission offset credit for pollutant in lb/quarter
- q = Quarter (1, 2, 3, or 4)
- QTR = This is the quarterly limit specified in Condition 19
- ≤15 = Those emission reduction credit certificates whose point of origin was within 15 miles of the CPP project
- >15 = Those emission reduction credit certificates whose point of origin was greater than 15 miles but less than 50 from the CPP Project.

REFERENCES

CEC (California Energy Commission) 2002a. Letter from Kristy Chew, CEC, to Colin Taylor, SMUD, regarding Data Requests #166-183. January 4, 2002. Docket date January 7, 2002.

CEC (California Energy Commission) 2002e. Letter from Kristy Chew, CEC, to Colin Taylor, SMUD, regarding Data Requests Set 3, #184-253. April 5, 2002. Docket date April 5, 2002.

Rubenstein, Gary. 2001a. Letter from Gary Rubenstein, Sierra Research, to Brian Krebs, Sacramento Metropolitan Air Quality Management District, regarding Application for Determination of Compliance and Authority to Construct – Application Nos. 16006 to 16015; Distant ERC Sources. December 13, 2001. Docket date December 14, 2001.

Rubenstein, Gary. 2001b. Letter from Gary Rubenstein, Sierra Research, to Brian Krebs, Sacramento Metropolitan Air Quality Management District, regarding Application for Determination of Compliance and Authority to Construct – Application Nos. 16006 to 16015; Interpollutant Trading Analysis. December 5, 2001. Docket date January 15, 2002.

Rubenstein, Gary. 2002a. Letter from Gary Rubenstein, Sierra Research, to Brian Krebs, Sacramento Metropolitan Air Quality Management District, regarding Application for Determination of Compliance and Authority to Construct – Application Nos. 16006 to 16015; Interpollutant Offset Ratio. January 30, 2001. Docket date February 27, 2002.

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SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.

SMUD (Sacramento Municipal Utility District) 2001b. Application for Confidential Designation of sources and supply of emission reduction credits (ERCs) (1) ERC Certificates and Engineering Evaluation; 2) Distances Between CPP and ERC Sources; 3) Contacts for Potential ERCs; and 4) Evaluation of Interpollutant Ratio Methodologies. October 23, 2001. Docket date November 5, 2001.

SMUD (Sacramento Municipal Utility District) 2001c. Revised Application for Confidential Designation of 1) sources and pricing of air emission reduction credits

(ERCs) and related materials; 2) cultural resources; and 3) paleontological resources. October 30, 2001. Docket date November 5, 2001.

SMUD (Sacramento Municipal Utility District) 2001d. Data Adequacy Supplemental Information for the SMUD Cosumnes Power Plant. November 13, 2001. Docket date November 16, 2001.

SMUD (Sacramento Municipal Utility District) 2001e. Revised Application for Confidential Designation regarding 1) sources and pricing of air emission reduction credits (ERCs) and related materials; 2) cultural resources; and 3) paleontological resources. November 26, 2001. Docket date November 27, 2001.

SMUD (Sacramento Municipal Utility District) 2001f. Supplemental Information Regarding the Application for a Determination of Compliance/Authority to Construct. November 28, 2001. Docket date November 28, 2001.

SMUD (Sacramento Municipal Utility District) 2002c. Letter from Jane Luckhardt, Downey Brand Seymour & Rohwer, to Kristy Chew, CEC, regarding Objection to California Energy Commission Staff Data Request 183. January 14, 2002. Docket date January 14, 2002.

SMUD (Sacramento Municipal Utility District) 2002d. Data Response, Set 2A. February 4, 2002. Docket date February 4, 2002.

SMUD (Sacramento Municipal Utility District) 2002e. Data Response, Set 1C. February 4, 2002. Docket date February 5, 2002.

SMUD (Sacramento Municipal Utility District) 2002f. Data Response, Set 2B. February 15, 2002. Docket date February 19, 2002.

SMUD (Sacramento Municipal Utility District) 2002g. Data Response, Set 1D. February 15, 2002. Docket date February 19, 2002.

SMUD (Sacramento Municipal Utility District) 2002h. Data Response, Set 1F – Supplement to Data Response #39. February 27, 2002. Docket date March 11, 2002.

SMUD (Sacramento Municipal Utility District) 2002j. AFC Supplement A (Revised General Arrangement). March 15, 2002. Docket date March 15, 2002.

SMUD (Sacramento Municipal Utility District) 2002k. Data Response, Set 1G – Responses to Data Requests 16, 22, 29, 30, 31, 50, 51, 56, 87, 88, 143, 144, 145, and 146. March 19, 2002. Docket date March 19, 2002.

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SMUD (Sacramento Municipal Utility District) 2002m. Data Response, Set 1H – Responses to Data Requests 19, 20, 25, 29, 30, 31, and 39. March 29, 2002. Docket date March 29, 2002.

SMUD (Sacramento Municipal Utility District) 2002o. Data Response, Set 3A. April 15, 2002. Docket date April 15, 2002.

SMUD (Sacramento Municipal Utility District) 2002p. AFC Supplement B. April 15, 2002. Docket date April 15, 2002.

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SMUD (Sacramento Municipal Utility District) 2002w. Letter from Stuart Husband, SMUD, to Aleta Kennard, Sacramento Metropolitan Air Quality Management District, regarding SMUD Cosumnes Power Plant – Application for Determination of Compliance and Authority to Construct, Application Nos. 16005 to 16015 Placer County APCD Approval of Iner-District ERC Transfer. April 26, 2002. Docket date May 3, 2002.

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BIOLOGICAL RESOURCES

Melinda Dorin

INTRODUCTION

This section provides staff's analysis of potential impacts to biological resources from Sacramento Municipal Utility District's (SMUD) proposal for the construction and operation of the Cosumnes Power Plant (CPP) project. This analysis addresses impacts to federally- and state-listed species, species of special concern, wetlands, and other areas of critical biological concern. This document presents information regarding the affected biotic community, the potential environmental impacts associated with the construction and operation of the proposed project, and where necessary, specifies mitigation plans and compensation measures to reduce potential impacts to insignificant levels. This document also determines compliance with applicable laws, ordinances, regulations, and standards (LORS), and specifies conditions of certification.

This analysis is based, in part, on information provided as of July 10, 2002 from SMUD's Application for Certification (AFC) (SMUD 2001a), SMUD's Responses to Data Requests Sets 1A – 1I and 3A-3B (SMUD 2002a, 2002b, 2002e, 2002g, 2002h, 2002i, 2002k, 2002m), wetland delineation report (SMUD 2002x), the Biological Resources Assessment (SMUD 2002z), site visits, and correspondence and discussions with the California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the U.S. Army Corps of Engineers (ACOE). Information was also gathered at the January 24, 2002 and June 12, 2002 data response workshops.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

- **Clean Water Act of 1977**
Title 33, United States Code, section 404 et seq., prohibit the discharge of dredged or fill material into the waters of the United States without a permit.
- **Endangered Species Act of 1973**
Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq., designate and provide for protection of threatened and endangered plant and animal species, and their critical habitat.
- **Migratory Bird Treaty Act**
Title 16, United States Code, sections 703-712, prohibit the take of migratory birds, including their eggs.
- **Bald and Golden Eagle Protection Act**
Title 16, United States Code, section 668, protects bald and golden eagles from possession, selling, purchase, barter, offers to sell, purchase or barter, transport, export or import, at any time or in any manner, alive or dead, or any part, nest, or egg thereof of the foregoing eagles.

- **Magnuson-Stevens Act as Amended in 1996**

Title 16 United States Code, section 1855(b), 50 CFR 600.905 – 930, define Essential Fish Habitat (EFH) for federally-managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This law requires consultation by a federal agency with NMFS when a proposed action may adversely affect EFH.

STATE

- **California Environmental Quality Act (CEQA)**

Public Resources Code §21000 et seq. mandate protection of California's environment and natural resources to develop and maintain a high-quality environment now and in the future. Specific goals of CEQA are for California's public agencies to: 1) identify the significant environmental effects of their actions; and, either 2) avoid those significant environmental effects, where feasible; or 3) mitigate those significant environmental effects, where feasible.

- **Fish & Game Code Sections Protecting Biological Resources**

California Endangered Species Act of 1984: Fish and Game Code section 2050 et seq. protect California's rare, threatened, and endangered species.

Nest or Eggs: Fish and Game Code section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.

Birds of Prey or Eggs: Fish and Game Code section 3503.5 protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Migratory Birds: Fish and Game Code section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.

Fully Protected Species: Fish and Game Code sections 3511, 4700, 5050, 5515 prohibit take of animals, or their habitat, that are classified as "Fully Protected" in California.

Non-game Birds: Fish and Game Code sections 3800 et seq. protect all non-game birds by making it unlawful to take non-game birds or parts of a bird unless otherwise provided in this Code's section.

Significant Natural Areas: Fish and Game Code section 1930 et seq. designate certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.

Native Plant Protection Act of 1977: Fish and Game Code section 1900 et seq. designate state rare, threatened, and endangered plants.

Streambed Alteration Agreement: Fish and Game Code section 1600, evaluates project impacts to waterways, including impacts to vegetation and wildlife from sediment, diversions, and other disturbances.

- **California Code of Regulations – Endangered Species**

Title 14, sections 670.2 and 670.5 list animals of California designated as rare, threatened, or endangered.

- **Regional Water Quality Control Board Certification**

To verify that the federal Clean Water Act permitted actions comply with state regulations, the Applicant would need to obtain a Section 401 certification from the Central Valley Regional Water Quality Control Board (RWQCB). The Regional Board provides its certification after reviewing the permit(s) that would be provided by the U.S. Army Corp of Engineers.

LOCAL

- **Tree Preservation Ordinance**

Sacramento County Code (SCC 480 § 1, 1981) Chapter 19.12 preserves and protects native oak trees, as well as giving discretionary authority to the county to protect other tree species. It establishes standards and measures for the preservation and protection of trees.

- **Sacramento County General Plan (1993)**

The Conservation Element contains specific objectives to preserve water quality and soils that have benefits to biological resources. It also contains specific policies and goals for preserving marsh and riparian areas, vernal pools, and ephemeral wetlands, urban streams, trees, rare and endangered species, fisheries, and for promoting resource conservation areas.

SETTING

REGIONAL

Prior to about 1850, there were many diverse habitat types in the Central Valley, including freshwater marshes, grasslands, riparian woodlands, vernal pools and foothill woodlands. Humans have impacted all of these habitats. Farming, grazing, the introduction of exotic weed species and urban and suburban development have reduced these habitats to remnants.

The site of the proposed CPP is in the southern portion of Sacramento County, north of San Joaquin County and west of Amador County. The City of Sacramento is located about 23 miles northwest of the project site and the City of Elk Grove is located about 14 miles northwest of the project site. The foothills to the east of the project site rise to the western slope of the Sierra Nevada Mountains. There are many reservoirs and lakes in the foothills that are used for recreational camping, fishing, boating, hiking, and other outdoor activities. The closest Class I Wilderness Areas are the Mokelumne and Carson-Iceberg Wilderness Areas, which are about 55 miles east of the project site. The regulations that pertain to Wilderness Areas were designated by the Wilderness Protection Act of 1964. Class 1 federal lands include areas such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the federal Clean Air Act.

The Sacramento River runs from north to south through Sacramento County about 22 miles to the west of the proposed project site. The American River joins the Sacramento River in the City of Sacramento approximately 26 miles north of the project site. There are several creeks and rivers in the region that begin in the Sierra Nevada Mountains, or the foothills of the Sierra Nevada, and flow westward to the Sacramento–San Joaquin Delta. South of the American River is the Cosumnes River, Badger Creek, Laguna Creek, Dry Creek, and the Mokelumne River. The Cosumnes River, located about 14 miles east northeast of the CPP site, is the last remaining undammed river on the western slope of the Sierra Nevada, and flows 80 miles to the Sacramento-San Joaquin Delta.

There are also several preserves, parks, and recreation areas in the region of the proposed CPP. The Nature Conservancy (TNC) and the CDFG own the Cosumnes River Preserve, which is located about 15 miles west of the project site. Since TNC's first purchase of 85 acres in 1984, the preserve has grown to over 37,042 acres and provides essential habitat to many species that frequent the Central Valley of California. Tens of thousands of Pacific Flyway birds winter at the preserve. Among those are more than half of the Central Valley's population of wintering greater sandhill cranes (for scientific names see **Biological Resources Table 1**). More than 200 species of birds have been recorded on and around the preserve. The preserve is also home to many mammals, reptiles, amphibians and fish. The preserve supports many different habitats such as organic rice farming, seasonal and permanent freshwater wetlands, riparian woodland, blue oak woodland, vernal pools, and shallow water habitat (TNC 2002).

The Valensin Preserve is about 9 miles northwest of the site and is part of the Cosumnes River Preserve. The North Fork of Badger Creek is a tributary to Badger Creek, and both run through the Valensin Preserve. Badger Creek is a tributary to the Cosumnes River. This area consists of vernal pools, seasonal and permanent freshwater wetlands, riparian woodland and vernal pools and is listed in the California Natural Diversity Database (CNDDDB) as having Great Valley valley riparian oak habitat. Badger Creek also provides habitat for the federally- and state-listed giant garter snake.

About 9 miles to the south east of the proposed project is Camanche Reservoir, located on the Mokelumne River. There are campsites, an RV park, and cottages located on both the north and south shores. Fishing, water sports, picnic, and recreation areas are all available. The Mokelumne River provides habitat to the spring-run chinook salmon, and central valley steelhead, as well as a riparian corridor for other species such as nesting birds. There is a fish hatchery at Camanche Dam that is owned by East Bay Municipal Utility District and operated by CDFG.

Rancho Seco Recreation Area includes Rancho Seco Reservoir and the Amanda Blake Memorial Wildlife Refuge. The Rancho Seco Recreation Area, located about 2 miles to the east of the CPP site, is the closest park to the proposed CPP. The 400-acre recreation area, owned and operated by SMUD, has picnic tables and fishing access on Rancho Seco Reservoir. SMUD stocks the 160-acre reservoir with rainbow trout and other sport-fishing species such as bass (*Micropterus sp.*), crappie (*Pomoxis nigromaculatus*), catfish (*Ictalurus sp.*), and bluegill (*Lepomis macrochirus*). Boating, sailing, windsurfing, swimming, camping, and bird watching are also popular activities. There are large trees around the reservoir, which can provide nesting habitat for

Swainson's hawks and other bird species including white tailed kites and red-tailed hawks (*Buteo jamaicensis*). Rancho Seco Reservoir receives its water from the Folsom South Canal, a canal maintained and operated by the U.S. Bureau of Reclamation (USBR).

Exotic animals can be seen at the 75-acre Amanda Blake Memorial Wildlife Refuge. The refuge is home to animals that have been rescued by the Performing Animal Welfare Society (PAWS), which leases the property from SMUD. Information on Rancho Seco Park and the Amanda Blake Wildlife Refuge can be found at <http://www.smud.org/community/ranchoseco.html>.

Recovery Plans and Critical Habitat

Salmon and Steelhead Evolutionarily Significant Units (ESUs)

The NMFS has classified salmon into Evolutionarily Significant Units (ESU). An ESU is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout. Factors used in determining an ESU includes spatial, temporal, and genetic isolation, maturation rates and other life history traits. Central Valley spring and fall/late-fall run chinook salmon, Sacramento Valley winter run chinook salmon, and Central Valley steelhead have each been classified into an ESU. Spring and winter run chinook salmon and steelhead use the Sacramento River, which has been designated as critical habitat by NMFS (NMFS 2000). There is a Pacific Coast Salmon Plan that outlines Essential Fish Habitat (EFH) and identifies activities that could potentially harm EFH as well as conservation recommendations. The document is available electronically on the NMFS Southwest Region web site (NMFS 2002).

Critical Habitat

Designated critical habitat for the Central Valley spring-run ESU includes all river reaches accessible to listed chinook salmon in the Sacramento River and its tributaries. Also included are the adjacent riparian areas as well as river reaches and estuarine habitats of the Sacramento-San Joaquin Delta west to the Golden Gate Bridge and San Francisco Bay Bridge (NMFS 2000).

Designated critical habitat for the Central Valley steelhead ESU includes all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and all of their tributaries. Also included are the adjacent riparian areas as well as river reaches and estuarine habitats west to the Golden Gate Bridge and the San Francisco Bay Bridge (NMFS 2000).

Giant Garter Snake

The *Draft Recovery Plan for the Giant Garter Snake* (USFWS 1999a) outlines the species life history, habitat needs, distribution throughout the Central Valley of California, and the recovery strategy for the species. The ultimate goal of the Draft Recovery Plan is to de-list the giant garter snake from the Federal Endangered Species List when the Recovery Criteria are met. Loss of habitat remains the greatest threat, but road kills may also be a significant mortality factor in areas where roads are in close proximity to giant garter snake populations. Protection of existing habitat is one of the

key components of the recovery strategy for this species. Because of the loss of natural habitat, giant garter snakes are often found in agricultural wetlands, drainage canals, managed marshes, and adjacent uplands in the Sacramento Valley. Giant garter snakes are present in the Cosumnes River Preserve as well as neighboring areas that have appropriate habitat. The USFWS recognizes the Badger Creek/Willow Creek area as having one of the remaining 13 extant populations (USFWS 1999a).

SITE VICINITY AND DESCRIPTION

In the vicinity of the project site and the related linear facilities, there are several different habitat types present including annual grasslands, vernal pools, permanent and seasonal wetlands, and riparian woodlands. There are also vineyards that encompass approximately 550 acres to the west and north of the proposed site and annual grassland that is actively grazed to the south and east (WAC 1999).

For the purpose of this analysis, the designation of special-status species includes all federally- and state-listed species and species proposed for listing under the California and Federal Endangered Species acts, federal species of concern, state species of special concern, and plant species designated as rare, threatened, or endangered (List 1B or List 2) by the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2001). **Biological Resources Table 1** is a list of the sensitive plant and animal species and CNDDB natural communities with a potential to occur in the project vicinity.

Power Plant Site and Laydown Area

The 30-acre power plant site and the 20-acre laydown area consist of annual grassland with wetlands dispersed throughout the site (SMUD 2002e, Data Response 18; SMUD 2002x, Data Response 206). All wetlands cataloged in the wetland delineation showed presence of all three wetland indicators (wetland hydrology, hydric soils, and hydrophytic vegetation). The soil type in the project area is predominately Redding Gravelly Loam (map unit 198). Depressional areas within the map unit are mapped as hydric inclusions on the Sacramento County hydric soil list. Redding soils are described as having mostly convex slopes incised by many shallow drainages and depressions. Water is perched above the claypan for short periods following heavy rains. Runoff ponds in inter-mound areas (SMUD 2002x, Appendix C and Attachment BR-206D).

The land proposed for the CPP site has not been leveled for agricultural use and contains many of the natural features present in areas with vernal pools and seasonal swales (Dorin, pers. obs.). There are several wetland features on the site, as well as a mine-tailing pond directly east of the project site that holds water all year. Clay Creek, which crosses the proposed plant site, drains to Hadselville Creek west of the site. Hadselville Creek is a tributary to Laguna Creek, which is a tributary to the Cosumnes River. There are also several large degraded vernal pools located between the proposed project site and the existing Rancho Seco Nuclear Facility site (SMUD 2002e, Data Response 18). SMUD is proposing to redirect two seasonal swales that cross the proposed laydown area, travel under Clay East Road through the proposed project site, and Clay Creek.

Biological Resources Table 1
Sensitive Species and Natural Communities
That Have Been Observed or are Presumed to be in CPP Project Area

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status*</u>
Plants		
Dwarf downingia	<i>Downingia pusilla</i>	--/--/2
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	--/E/1B
Rose mallow	<i>Hibiscus lasiocarpus</i>	--/--/2
Delta tule pea	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	FSC/--/1B
Legenere	<i>Legenere limosa</i>	--/--/1B
Pincushion navarretia	<i>Navarretia myersii</i> ssp. <i>myersii</i>	--/--/1B
Slender orcutt grass	<i>Orcuttia tenuis</i>	FT/CE/1B
Sacramento orcutt grass	<i>Orcuttia viscida</i>	E/E/1B
Sanford's arrowhead	<i>Sagittaria sanfordii</i>	FSC/--/1B
Invertebrates		
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	FT/--
Midvalley fairy shrimp	<i>Branchinecta mesovallensis</i>	FSC/--
California linderiella fairy shrimp	<i>Linderiella californica</i>	FSC/--
Vernal pool tadpole shrimp	<i>Lepidurus packardi</i>	FE/--
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT/--
Fish		
Spring-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	FT/ST
Winter-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	FE/SE
Fall/late-fall run chinook salmon	<i>Oncorhynchus tshawytscha</i>	FC/CSC
Steelhead-Central Valley ESU	<i>Oncorhynchus mykiss</i>	FT/--
Delta smelt	<i>Hypomesus transpacificus</i>	FT/ST
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	FT/--
Amphibians		
Western spadefoot toad	<i>Scaphiopus hammondii</i>	FSC/CSC
California tiger salamander	<i>Ambystoma tigrinum californiense</i>	FC/CSC
Reptiles		
Giant garter snake	<i>Thamnophis gigas</i>	FT/ST, CFP
Northwestern pond turtle	<i>Clemmys marmorata marmorata</i>	FSC/CSC
Birds		
Double-crested cormorant	<i>Phalacrocorax auritus</i>	--/CSC
White-faced ibis (rookery site)	<i>Plegadis chihi</i>	FSC/CSC
Greater sandhill crane	<i>Grus canadensis tabida</i>	--/ST, CFP
Trumpeter swan	<i>Cygnus buccinator</i>	--/CFP
Golden eagle	<i>Aquila chrysaetos</i>	--/CSC
Bald eagle	<i>Haliaeetus leucocephalus</i>	FPD/SE
White-tailed kite	<i>Elanus leucurus</i>	--/CFP
Northern harrier (nesting)	<i>Circus cyaneus</i>	--/CSC
Cooper's hawk	<i>Accipiter cooperii</i>	
Swainson's hawk	<i>Buteo swainsoni</i>	--/ ST
Ferruginous hawk	<i>Buteo regalis</i>	FSC/CSC
Western burrowing owl	<i>Athene cunicularia hypugea</i>	FSC/CSC
Short-eared owl	<i>Asio flammeus</i>	FSC/CSC
Vaux's swift	<i>Chaetura vauxi</i>	FSC/CSC
Lewis' woodpecker	<i>Melanerpes lewis</i>	FSC/--

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status*</u>
Loggerhead shrike	<i>Lanius ludovicianus</i>	FSC/CSC
California horned lark	<i>Eremophila alpestris actia</i>	FSC/CSC
Tricolored blackbird (nesting colony)	<i>Agelaius tricolor</i>	FSC/CSC
Lawrence's goldfinch	<i>Carduelis lawrencei</i>	FSC/--
Mammals		
Long-legged myotis bat	<i>Myotis volans</i>	FSC/--
Yuma myotis	<i>Myotis yumanensis</i>	FSC/--
Small footed myotis bat	<i>Myotis ciliolabrum</i>	FSC/--
San Joaquin pocket mouse	<i>Perognathus inornatus</i>	FSC/--
Habitats		
Northern hardpan vernal pool		
Coastal and valley freshwater marsh		
Great Valley mixed riparian forest		
Valley oak woodland		
<p>* Status Legend (Federal/State/CNPS lists, CNPS list is for plants only): FE = Federally-listed Endangered; FT = Federally-listed Threatened; FSC = Federal Species of Concern; FPD = Federally proposed (Delisting); FC = Candidate Species for Listing; SE = State-listed Endangered; ST = State-listed Threatened; SR = State-listed Rare; SCE = State candidate (Endangered); SCT = State candidate (Threatened); CSC = California Species of Special Concern; CFP = California Fully-Protected species; 1B = List 1B are CNPS rare or endangered in California and elsewhere; 2 = List 2 are CNPS rare or endangered in California, but more common elsewhere; -- = not listed in that category .</p>		

Source: SMUD 2002z, SMUD 1994, CNDDDB 2002

Presently, the ACOE is reviewing the wetland delineation submitted by SMUD, and has not yet determined which of the wetland features may be jurisdictional wetlands, or "waters of the U.S". The ACOE Habitat Mitigation and Monitoring Proposal Guidelines (1996) states that the Federal Clean Water Act 404(b)(1) Guidelines allow permit issuance for only the least environmentally damaging practicable alternative, with practicability defined in terms of cost, logistics, and existing technology. There is a presumption that less environmentally damaging practicable alternatives exist for discharges into special aquatic sites such as wetlands. The ACOE policy and the goal of the Clean Water Act and the 404(b)(1) Guidelines is to maintain, restore, and enhance the nation's waters and to achieve a policy of no net loss of wetlands functions and values (ACOE 1996).

SMUD has categorized the wetlands on the site into the following types: seasonal wetland/degraded seasonal wetland, seasonal swale, vernal pool, historic vernal pool remnant, seasonal marsh, Placer tailing/riparian wetland mosaic, seasonal creek, perennial creek, and open water (SMUD 2002x, Delineation Report to the ACOE, Attachments 206D, 206C, 206E; SMUD 2002z, Biological Resources Assessment).

Vernal pools are formed in areas where there has been a formation of a dense claypan or hardpan layer at some depth below the surface. These hardpans are thick enough that rain and surface water cannot seep into the lower soil column. Instead, the water accumulates on the surface. Vernal pools form a microhabitat that is important to many of the endemic plants of California (Holland 1976). Plants such as dwarf downingia,

Boggs Lake hedge-hyssop, legenere, pincushion navarretia, slender orcutt grass, and Sacramento orcutt grass are found in vernal pool habitat. Vernal pool plant species were reported in the vernal pools and seasonal swales on the project site and laydown area during spring surveys (SMUD 2002z, Attachment BR-204B).

Rare plant surveys were completed in 1993 for the Rancho Seco Master Plan (SMUD 1994). Boggs Lake hedge-hyssop, legenere, and Sacramento orcutt grass were located in the vernal pool complex near Rancho Seco Reservoir. Rare plant surveys were also completed as part of the wetland delineation for the project, and additional spring surveys were completed in accordance with the CDFG and CNPS plant survey guidelines in May 2002. No sensitive plant species were observed during surveys (SMUD 2002 3D, Attachment BR-202).

Vernal pools also provide habitat for the vernal pool invertebrate species such as the federally-listed vernal pool fairy shrimp, midvalley fairy shrimp, California linderiella fairy shrimp, and vernal pool tadpole shrimp. SMUD was not required to survey for invertebrates since the USFWS assumes presence in this area of Sacramento County (Ken Fuller, Data Response Workshop January 24, 2002).

SMUD completed a survey of the mine tailing pond and found species such as Pacific tree frogs (*Hyla regilla*), bullfrogs (*Rana catesbeiana*), and introduced Louisiana red swamp crayfish (*Procambarus clarkii*) (SMUD 2002y). There are also several large trees around the pond that could provide nesting and resting habitat for bird species.

The annual grasslands on the CPP project site and laydown area provide suitable foraging and nesting habitat for a variety of bird species. There is a known Swainson's hawk nest within 3.5 miles of the CPP project site and laydown area (SMUD 2002z, Biological Resources Assessment Figure 8). A Swainson's hawk and a loggerhead shrike were also seen foraging at the site during special status species surveys (SMUD 2002e, Attachment BR-17) and a red-tailed hawk was nesting in an existing transmission line tower on the west side of the project site (SMUD 2002 3D, Attachment BR204B). A golden eagle was recorded about 5 miles east of the CPP project site in 1992 (CNDDDB records, July 2002). Tricolored blackbirds were seen foraging over the CPP site and laydown area during surveys for other species and there are multiple CNDDDB records for the area. Protocol level surveys for burrowing owls were only conducted on the project site. Burrowing owls were not seen (SMUD 2002z, Attachment BR204B), but there are sufficient small mammal holes that could provide potential burrow sites. Burrowing owl sign (pellets) was observed at a burrow near the northern edge of the proposed CPP in 2001 (CNDDDB records, July 2002).

A northwestern pond turtle was observed in Clay Creek north of the project site (SMUD 2001a, Table 8.2-3).

Transmission Line

The proposed transmission line corridor would be constructed from the northwest corner of the CPP to the existing Rancho Seco Nuclear Plant switchyard. The transmission line corridor would be 50 feet wide and 0.4 mile long, with 3 sets of two towers. SMUD proposes a 150-foot wide construction corridor that would be used for approximately 8 weeks (SMUD 2002z, Biological Resources Assessment Table 2). The proposed

locations of the towers are within 250 feet of several wetland features that exist between the plant site and Rancho Seco Nuclear Facility and near the location of the burrowing owl sign discussed above (SMUD 2002z, Biological Resources Assessment Figure 2).

Access Road

SMUD proposes to build a new 0.5-mile long access road from the existing paved Rancho Seco Park entrance south to Clay East Road. The access road would be located on an existing firebreak in annual grassland habitat and would cross several seasonal swales and vernal pools. The proposed road would be 25 feet wide and paved with an additional 25-foot wide disturbance for a year long period during road construction. (SMUD 2002d, Biological Resources Assessment Table 2 and Figure 2). The area near the proposed access road was delineated in 1993 as part of the Preliminary Delineation of Waters of the United States, Including Wetlands, for the Rancho Seco Park Master Plan (SMUD 2002x, Attachment 206E). The access road is not depicted in this report, and the area was outside the wetland delineation that was completed by SMUD for the CPP (SMUD 2002e, Attachment 18).

Water Supply

The proposed 0.4 mile long water supply pipeline starts at the northern end of the CPP site and would tie in at the Rancho Seco Nuclear Plant. It would cross annual grassland, Clay Creek, and several other wetland features. There are also additional wetland features, some of them degraded vernal pools, within 250 feet of the proposed water pipeline. The water used for cooling the CPP would be delivered via an existing structure at Folsom South Canal to the Rancho Seco Plant.

The source of the water supply is surface flow from the Lower American River, and is delivered under contract by the U.S. Bureau of Reclamation (USBR). SMUD has both Appropriative Water Rights under the jurisdiction of the State Water Resources Control Board (SWRCB) and a federal contract with the USBR for water deliveries. For information on the water supply, see the **Water and Soil Resources** section of this document.

SMUD has recently modified the CPP to include Zero Liquid Discharge (ZLD) technology, so no wastewater discharge to Clay Creek or evaporation ponds is necessary (SMUD 2002ac).

Natural Gas Pipeline and Compressor Stations

SMUD has proposed a preferred gas pipeline route and four alternatives. The preferred gas pipeline route is approximately 26.5 miles long and would cross a minimum of 40 wetland features including rivers, creeks, sloughs, irrigation canals, vernal pools, and seasonal wetlands. SMUD has proposed dry season trenching or horizontal directional drilling (HDD) as the method to cross the wetland features (SMUD 2001a, Table 8.14-8). SMUD has proposed three new valve stations, an inter-tie station, and two compressor stations in addition to the gas pipeline.

Starting at the Carson Ice-Gen Cogeneration Facility, the preferred gas pipeline route parallels the Union Pacific railroad tracks going south. Elderberry plants, the host plant for the valley elderberry longhorn beetle, are located along the railroad tracks north of Franklin Boulevard (SMUD 2002 3D, Attachment BR-206a). South of Elk Grove

Boulevard, the proposed pipeline goes through the Laguna Stone Lake Preserve, which is a vernal pool mitigation area created to mitigate for impacts from residential development. The Preserve is managed by Foothill and Associates, and requires USFWS approval for changes to the management plan or easements (Whitney, pers. comm.). The USFWS has expressed concern with construction activities within a mitigation area, and with the establishment of a permanent easement. Dwarf downingia, legenera, vernal pool fairy shrimp, and vernal pool tadpole shrimp are all present on the preserve (Whitney, pers. com).

The proposed gas pipeline then turns east at Core Rd to Ed Rau Road and continues east under an existing transmission line corridor. It then turns south again along an unimproved farm road and crosses the Cosumnes River, Badger Creek and the Cosumnes River Preserve, which provide habitat for greater sandhill cranes, burrowing owls, Swainson's hawks, giant garter snakes, anadromous fishes, valley elderberry longhorn beetles, and vernal pool invertebrates. There is also potential California tiger salamander habitat along the gas pipeline route. It then continues east again along Valensin Road and crosses Laguna Creek. It passes through agricultural areas including vineyards, hay crops, and rangeland (SMUD 2001a, Figures 6.1-2 to -7). The riparian areas along the gas pipeline route are potential nesting and foraging habitat for birds. The applicant has assumed presence for valley elderberry longhorn beetle at the Cosumnes River Preserve.

A protocol level survey for burrowing owls was requested by Energy Commission staff in Data Request 31 (CEC 2001c) and the locations of small mammal burrows that could be used by burrowing owls along the gas pipeline route were to be collected during spring surveys and provided to the Energy Commission staff in a figure (January 24, 2002 Data Response Workshop). There was one pair of burrowing owls observed along the northern end of the gas pipeline near Sims Road (SMUD 2002 3D, Attachment BR-204B), but information on potential burrowing owl locations and the results of protocol level surveys have not been provided.

Giant garter snakes are present along the gas pipeline route in the Badger Creek and Cosumnes River Preserve area as well as potentially occurring in any of the drainage canals or wetlands in the area.

Swainson's hawk nests have been recorded all along the gas pipeline route (CNDDDB 2002). Spring surveys by SMUD identified 5 potential Swainson's hawks nests along the gas pipeline route (SMUD 2002 3D, Attachment BR-204). The CDFG surveyed the area in 2000 and 2001 and found seven nests along the route (CDFG 2002a). A wetland delineation was completed for the proposed gas pipeline route as well as a rare plant survey. No listed plant species were observed (SMUD 2002z, Data Response 202). The wetland delineation maps identify several types of wetland areas along the proposed route including: agricultural ditches, drainage ditches, roadside ditches, agricultural ponds, pools, marshes, swales, creeks, open water, and canals (SMUD 2002z, Data Response 206).

Several trees were identified by SMUD along the gas pipeline route, which meet the guidelines for heritage trees as defined by the Sacramento County Tree Preservation Ordinance (SMUD 2002s, Data Response 186).

There are three proposed natural gas valve stations and an inter-tie station to be constructed along the proposed gas pipeline route, all of them located along existing roads in agricultural areas (SMUD 2002n, Figure 1-3 to 1-7). All of the surrounding agricultural fields are used for crops such as hay and alfalfa, which are used as foraging habitat by raptors and other bird species (SMUD 2002p, Section 2.2).

Two new natural gas compressor stations are proposed for Phase 2 of the CPP; one would be located near Winters, California, and the other near the Carson Ice-Gen Cogeneration Plant. The compressor station near Winters is bordered by orchards to the north and agricultural fields to the south. The closest potential nesting tree is within 100 yards of the site, with other trees located approximately 200 yards away. The Winters compressor station would be placed adjacent to the existing SMUD/PG&E inter-tie to the PG&E 400/401 interstate pipeline station. The second compressor station would be located in annual grasslands within the Sacramento Regional Wastewater Treatment Plant Bufferlands. There is an existing valve station at this site. According to SMUD staff, all of the new equipment would fit within the existing fence lines; no expansion of the existing fence lines would be required (June 11, 2002 site visit).

Gas Pipeline Alternative Route

SMUD proposed an alternative alignment that avoids the Laguna Stone Lake Preserve mitigation area labeled Alternative G4 in the AFC (SMUD 2001a, Section 6.2 and Figure 6.1-1). Staff asked SMUD to discuss the feasibility of alternative routes to avoid the mitigation area (CEC 2002e, Data Request 193). SMUD described the alternative route as proceeding east on Dwight Road, or another east-west road north of mile marker 3.0 of the proposed gas pipeline, then south along Franklin Boulevard to the Union Pacific railroad tracks at approximately mile 3.87 and continuing on the existing proposed route. The alternative route crosses the same drainage at Franklin Boulevard that it crosses along the railroad tracks in SMUD's preferred alternative. The alternative route would also result in separate HDD bores under Franklin Boulevard and the railroad tracks. SMUD's preferred alternative alignment would bore under the railroad tracks and Franklin Boulevard at the same time. Another alternative to SMUD's G4 route is along Sims Road, an east-west road that goes from the Sacramento Wastewater Treatment Facility and the Carson Ice-Gen Cogeneration Plant to Franklin Boulevard. Sims Road may have less traffic than Dwight Road. Burrowing owls are present along Sims Road in the Bufferlands, and the area has artificial dens for burrowing owls to use.

The manager of the Laguna Stone Lake Preserve requested that SMUD move the gas pipeline to the east of the railroad tracks, and out of the preserve. SMUD would need the concurrence of the Habitat Management Foundation and the USFWS to receive an easement through the existing conservation easement (SMUD 2002o, data response 192). Biology staff has coordinated with Energy Commission traffic staff about SMUD's concern with a significant impact to traffic along Franklin Boulevard if the alternative route was used (SMUD 2002o, data response 193). Traffic staff has indicated that feasible mitigation is available for any additional traffic impacts from construction activities along the roadways. The valve station locations would not change with the alternate alignment.

IMPACTS

DIRECT AND INDIRECT IMPACTS

Construction, operation, and maintenance activities of the proposed CPP project would result in the following impacts.

Permanent and Temporary Loss of Habitat

There would be a permanent loss of wetland habitat, and both temporary and permanent losses of upland habitat as a result of construction of the CPP and the associated facilities. The estimated amount of habitat impacted, if listed, is based on information provided in the Biological Resources Assessment and the wetland delineation reports (SMUD 2002z and SMUD 2002x).

Impacts are defined as temporary or permanent depending on whether the impacts occur to uplands or to wetlands, and for the length of time the impact will occur. For the upland habitat areas (annual grassland) that are used by special status species such as Swainson's hawks for foraging, an impact is considered permanent if the disturbance would last longer than one nesting season. For the project site and laydown area the permanently impacted upland includes the wetland that is foraging habitat during the dry season. Upland areas that would be subject to short-term disturbance (less than one nesting season) would not require additional habitat compensation, if revegetation and restoration are successful. All impacts to giant garter snake upland and aquatic habitat would be mitigated with habitat compensation. All impacts to wetlands are defined as permanent impacts and also require habitat compensation. A summary of the total estimated upland habitat that would be impacted is provided in **Biological Resources Table 2**.

Biological Resources Table 2
Permanent and Temporary Impacts to Upland Habitat

Project Component	Permanent (acres)	Temporary* (acres)
Power Plant:		
Power Plant Structures, Laydown, Parking	50	--
Linear Facilities:		
Access Road	3	--
Transmission Line Interconnection	≤ 0.01	7.3
Natural Gas Pipeline	--	205
Valve, Inter-tie, and Compressor Stations	0.34	unknown
Water Supply Pipeline	--	3.7
Totals:	≥ 53.35	≥ 216

*Upland habitats impacted less than 1 year.

Source: SMUD 2002x; SMUD 2002z

The CDFG *Staff Report regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (1994) states that based on studies, Swainson's hawks will forage within an approximate 10-mile radius from their nest site. New projects, which adversely modify nesting/foraging habitat, should be required to provide mitigation for

the project's impacts to the species. SMUD reported that the closest known Swainson's hawk's nest to the project site is approximately 3.5 miles away, south of Valensin Road (SMUD 2002z, Biological Resources Assessment Figure 8). There are also Swainson's hawk nests within 0.5 mile of the proposed gas pipeline.

The construction of the CPP would also result in a permanent loss of habitat for aestivating California tiger salamanders and foraging birds such as golden eagles, white-tailed kites, northern harriers, Cooper's hawks, western burrowing owls, loggerhead shrikes, California horned larks, and tricolored blackbirds. See **Biological Resources Table 3** for the amount of aestivating and foraging habitat impacted by the project. Construction of the CPP would result in a significant loss of aestivating and foraging habitat.

Construction of the gas pipeline would result in impacts to giant garter snake habitat. The USFWS guidelines identify giant garter snake habitat as the aquatic habitat and associated 200-foot wide upland swath that borders it (USFWS 1997). Giant garter snakes occupy drainage canals, agricultural wetlands, and managed wetlands. There is giant garter snake habitat along the gas pipeline route that would be impacted by construction activities. SMUD has not calculated the amount of giant garter snake habitat that would be impacted, but has assumed their presence near the Cosumnes River Preserve and Badger Creek, as well as the associated tributaries with the appropriate cover, hydrology, and prey (SMUD 2002z, Biological Resources Assessment page 13). Staff will continue to work with SMUD and the USFWS to calculate the amount of habitat that would be impacted by construction of the gas pipeline. Impacted giant garter snake habitat will be added to **Biological Resources Table 3** for the Final Staff Assessment (FSA). Loss of giant garter snake habitat would result in a significant impact.

Vernal pool crustacean habitat is impacted permanently if it is disturbed indirectly or directly by project activities. Habitat includes any areas that seasonally pond water in which one or more of the listed vernal pool species could exist (USFWS 1996). Due to the sensitive nature of vernal pool and seasonal swale soils and hydrology, and the need for the hard pan layer to stay intact to protect the integrity of the pool, any disturbance within 250 feet of a pool or complex would result in a significant impact to that pool. Using the USFWS/ACOE Programmatic Biological Opinion for listed vernal pool crustaceans as a guide (USFWS 1996), SMUD has calculated 11.6 acres of wetlands that are potential habitat for either vernal pool tadpole shrimp or vernal pool fairy shrimp, that would be impacted by the project. Although midvalley fairy shrimp and California linderiella fairy shrimp are not included in the Programmatic Biological Opinion, they occupy similar niches and would be impacted by loss of habitat. The Programmatic Biological Opinion can only be used as a guide to determine impacts since SMUD's calculated acreage impacts to vernal pools is greater than the 5-acre limit allowed for in the Programmatic Biological Opinion.

Staff has reviewed the wetland delineation and the Biological Resources Assessment submitted by SMUD (SMUD 2002z). Staff notes that the acreage amount calculated by SMUD does not include all of the wetlands or the entire invertebrate habitat that would be impacted from construction for the following reasons:

- SMUD has only included the vernal pools in their habitat calculation and delineation if they had water in them in February 2002 (SMUD 2002z, Biological Resources Assessment page 9).
- There also appear to be vernal pools present in the aerial photos that were not delineated. These pools appear to be within 250 feet of the construction corridor, but do not overlap with it. Examples of the areas are in Figure 9 and 11 of 55 (SMUD 2002z, Attachment 206a).

The standardized ACOE 1987 wetland delineation method requires that three wetland indicators be present (i.e., wetland hydrology, hydric soils, and hydrophytic vegetation). To satisfy the wetland hydrology component, water does not have to be seen, but evidence of water from driftlines, watermarks, or sediment deposits are enough to confirm that wetland hydrology exists. If construction activities occur within 250 feet of part of a pool, the hydrology of the pool can change from changes in surface flow, impacts to the associated uplands, and impacts to the hardpan layer and the entire vernal pool would be impacted significantly. Staff will continue to work with SMUD, the USFWS, and the ACOE to calculate the amount of invertebrate habitat impacted based on the total acres of vernal pool crustacean habitat within 250 feet of construction activities. The ACOE has not initiated consultation with the USFWS at the time of writing this PSA, and the Biological Assessment has not been submitted by the ACOE to be deemed adequate by the USFWS. The amount of habitat considered vernal pool crustacean habitat is likely to change as a result of the fact that the data and analysis submitted by SMUD are incomplete. The amount of vernal pool crustacean habitat impacted by construction will be added to **Biological Resources Table 3** for the FSA.

The SMUD preferred gas pipeline route would result in significant impacts to the Laguna Stone Lakes Preserve. Impacts would result from construction of the gas pipeline through the mitigation area. The need to establish a permanent easement and conduct routine maintenance during operations of the CPP could result in ongoing disturbance to the area. There are several created vernal pools close the proposed alignment, and access to the area would require disturbance of the vernal pools and associated upland habitat. The impacts from this route are unmitigable. The Laguna Stone Lakes Preserve was established to mitigate for other habitat losses and should not be impacted by new construction or have additional permanent easements established within them. The impacts to the Laguna Stone Lakes Preserve are avoidable by using a feasible alternate route that was identified by SMUD. An alternate route may reduce the amount of vernal pool habitat disturbed by the gas pipeline.

There would also be wetlands impacted by the construction of the CPP, the access road, and the gas pipeline that are not invertebrate habitat. Some of these wetlands may be jurisdictional by the ACOE or "waters of the U.S." SMUD has calculated the amount of jurisdictional wetlands to be 11.722 acres with an additional 5.09 acres of non-jurisdictional wetlands (SMUD 2002x, Data Response 206). When the ACOE verifies the wetland delineation that SMUD has submitted, SMUD has stated they will add the additional wetland acreage to the vernal pool species mitigation (SMUD 2002z, Biological Resources Assessment, page 37). SMUD is also required to receive Clean Water Act 401 Certification from the Regional Water Quality Control Board (RWQCB). Staff will work with SMUD, the USFWS, the ACOE, and the RWQCB to assess impacts

to wetlands that are not invertebrate habitat, and to mitigate for those impacts. The amount of wetland habitat impacted by construction will be updated, if necessary, to **Biological Resources Table 3** for the FSA.

The proposed water pipeline and the transmission line corridor crosses seasonal swales, a historical vernal pool remnant, and degraded pools north of the site between the proposed CPP and Rancho Seco Plant. The seasonal swales and historical vernal pool remnant would be impacted significantly by construction activity within 250 feet of both the water pipeline and the transmission line corridor (SMUD 2002x, Data Response 206). The amount of wetlands impacted by construction will be updated, if necessary, to **Biological Resources Table 3** for the FSA.

Biological Resources Table 3
Acres Impacted (by Species and Habitat)

Project Component	Vernal Pool Invertebrate Habitat	Wetland Habitat	Giant Garter Snake Habitat	Upland Foraging Habitat
Power Plant:				
Power Plant Structures, Laydown, Parking	unknown	0.962	-	50
Linear Facilities:				
Access Road	unknown	Included above	-	3
Transmission Line Interconnection	unknown	Included above	-	≤ 0.01
Water Supply Pipeline	unknown	Included above	-	-
Natural Gas Pipeline Compressor and Valve Stations	unknown	15.85	unknown	0.34
Totals:	unknown	≥ 16.812	unknown	≥ 53.35

Source: SMUD 2002z, Data Response 206

Species Mortality and Injury

Rare Plants

All of the sensitive plant species identified in **Biological Resources Table 1** are either associated with vernal pool habitats or wetlands. None of the plant species were found during SMUD's special-status plant surveys, although they are known to occur at the Laguna Stone Lake Preserve site. Construction of the gas pipeline through the Preserve could result in significant impacts to sensitive plants. Construction of the gas pipeline along the alternative route, G4, would not likely result in significant impacts to plant species. Plants would not likely be impacted at the project site.

Heritage Trees

SMUD identified several heritage trees along the gas pipeline route. SMUD did not survey the trees in the riparian area of the Cosumnes River since they intend to use

HDD bore technology in that location (SMUD 2002s, Data Response 186). The Sacramento County Tree Preservation Ordinance requires a permit for activities that include trenching, grading, or filling within the dripline of a heritage tree. Removing, killing, or destroying any tree without a tree permit, or unless authorized as a condition of a discretionary project approval by the Board of Supervisors, Planning or Zoning Commissions is not allowed. Staff and the CDFG (CDFG 2002b) have concerns that the HDD bore under the Cosumnes River could still impact heritage trees due to the need for a guidance system, equipment laydown, or from emergency response to a frac-out. Surveys of the heritage trees in this location should be submitted so mitigation, if necessary, can be adequately identified. Impacts to any heritage trees would be significant.

Invertebrates

Vernal pool invertebrates: The USFWS has communicated to SMUD and staff that vernal pool invertebrate species should be assumed present in all of the areas that seasonally pond water (Data Response Workshop January 24, 2002). There are wetland features all along the gas pipeline route and at the site that would be disturbed as a result of the proposed CPP. Individuals of listed crustaceans and their cysts may be directly injured or killed by activities leading to the destruction of the pools in which they exist, or indirectly injured by changes in hydrology, building of roads, use of pesticides/herbicides and introduced predators (USFWS 1996). Impacts to individuals or their cysts would result in “take,” which requires an USFWS incidental take permit under Section 7 of the Federal Endangered Species Act. Staff has concluded that construction of the CPP would result in significant impacts to vernal pool invertebrates.

Valley elderberry longhorn beetle: This federally-listed threatened insect is completely dependent on its host plant, the elderberry plant (*Sambucus* spp.). The project site and gas pipeline route were surveyed for elderberry plants. Surveys were not conducted at the Cosumnes River crossing, but SMUD has assumed presence in this location (Data Response Workshop June 12, 2002). Adverse impacts to any elderberry plants would result in significant impacts to the valley elderberry longhorn beetle. Impacts to elderberry plants would result in “take,” which requires an USFWS incidental take permit under Section 7 of the Federal Endangered Species Act.

Fisheries

SMUD has redesigned the CPP to use Zero Liquid Discharge technology (SMUD 2002ac), therefore, no impacts to fisheries resources in Clay Creek or downstream in the Cosumnes River from cooling water discharge would occur.

The water supply is described above briefly in the Water Supply section and in more detail in the **Soils and Water Resources** section of this document. The USBR is in the process of renewing it's contract with SMUD, which expires in 2008. The USBR is also preparing an Environmental Impact Statement, required by NEPA, and will initiate consultation with the NMFS to address potential impacts to fisheries at the source (Data Response Workshop June 12, 2002). The EIS will address potential impacts from renewal of all of the federal contracts that use the Folsom South Canal for deliveries. NMFS and staff are concerned about the transfer of surface flow from the American River Basin to the Cosumnes River Basin.

The amount of water that SMUD is entitled to under their appropriative water rights that SMUD holds through the SWRCB would not change as a result of the project. The project is not using a new water source, so impacts to fisheries from the appropriation of water should have been addressed by the SWRCB prior to the proposed CPP. Staff has received information pertaining to three of SMUD's water rights, but is still waiting for additional water rights information from the SWRCB. Staff is working with NMFS in order to confirm that fisheries impacts in the Lower American River have been addressed. Staff does not have enough information to conclude that impacts to fisheries resources in the Lower American River have been addressed previously.

SMUD proposes to use HDD technology to lay the gas pipeline under the Cosumnes River, Laguna Creek, and Badger Creek. Bentonite clay is used as a lubricant during drilling. There is potential for bentonite to leak to the water body surface through fractures in the earth and cause a "frac-out", which would have a significant impact on fisheries and their habitat.

Amphibians

Western spadefoot toad: This toad is a federally- and state-listed species of special concern. Western spadefoot toads lay eggs in early March and by the end of spring tadpoles metamorphose into adults and move into upland areas to aestivate (Zeiner 1988). Upland habitat containing small mammal burrows and large cracks in the soil could be used for aestivation during the dry season. There are no historical records from the site or project vicinity that show presence of western spadefoot toads. SMUD conducted surveys for amphibian species along the gas pipeline route and at the project site and did not locate any individuals (SMUD 2002y). Where they occur in their range, western spadefoot toads are usually abundant (Zeiner 1988). No impacts to western spadefoot toads are expected from the CPP.

California tiger salamander: This salamander is a candidate species for federal listing and is a state listed species of special concern. The CPP project is within the historical range of the California tiger salamander and is within the vicinity of current known locations. For tiger salamander larvae to reach successful transformation to adults it is necessary for potential breeding sites to contain water for a minimum of 10 weeks in the winter and spring months (CDFG 1997). Upland habitat containing small mammal burrows and large cracks in the soil could be used for aestivation during the dry season.

There is a potential for California tiger salamander breeding and aestivating habitat on the project site and laydown area. The *Revised Survey Protocol for the California Tiger Salamander (Ambystoma californiense)* (CDFG 1997) suggests that for a negative finding to be accepted, one or more of the following conditions or minimum survey efforts must support it:

1. The habitat assessment demonstrates that the site is not suitable for California tiger salamander, or
2. Standard aquatic surveys in two consecutive years and a drift fence survey during the second-year survey window all have negative results, or
3. There is no aquatic habitat onsite and a drift fence survey is negative.

Dr. Mark Jennings completed a survey for the California tiger salamander and western spadefoot toad in April 2002 but did not find either species along the survey route. Bullfrog juveniles and adults (*Rana catesbeiana*), a predatory species, were present at some of the locations that had permanent water including the open water in the Cosumnes River Preserve and the mine tailing pond located east of the CPP site (SMUD 2002y). SMUD reported that California tiger salamander larvae were found by Ellyn Davis in 2002 at a created vernal pool approximately 0.25 mile east of Rancho Seco Reservoir (SMUD 2002, Biological Resources Assessment, page 17).

The presence of introduced fishes, bullfrogs, and crayfish in permanent and intermittent aquatic habitats may limit the successful recruitment of the small population of California tiger salamander in the Rancho Seco area (SMUD 2002y). The habitat assessment demonstrates that the CPP project site and laydown area provide suitable California tiger salamander breeding and aestivating habitat. A second year of surveys should be completed in order for a negative finding of breeding habitat to be accepted by staff. Until the results are reported, presence of potential California tiger salamander breeding pools is assumed. Construction of the CPP would have a significant impact on breeding and aestivating California tiger salamanders.

Reptiles

Giant garter snake: The giant garter snake is a federally- and state-listed threatened species and is classified as California Fully Protected. The active period for the giant garter snake is May 1 – October 1. Throughout this period the snake is active and if disturbed, usually retreats to water (Zeiner 1988). Giant garter snakes may be impacted by the construction of the gas pipeline in areas where construction is within 200 feet from the banks of giant garter snake aquatic habitat (USFWS 1997). Since the populations that would be impacted are sited in areas that the USFWS recovery plan designates as important to the recovery of the species, any potential impacts to these populations are significant.

Northwestern pond turtle: The northwestern pond turtle is a federally- and state-listed species of special concern. Pond turtles are associated with permanent water in a wide variety of habitats. Pond turtles require basking sites. Eggs are deposited in nests constructed along sandy banks or hillsides. Most activity is diurnal, although crepuscular and nocturnal activity has been observed (Zeiner 1988). Construction activities at the project site or along the gas pipeline could injure or harm individual turtles. Injury or mortality would result in significant impacts.

Birds

Western burrowing owl: The western burrowing owl is a state-listed species of special concern. Complete burrowing owl survey results have not been provided to staff. Field surveyors for the CPP checked for burrowing owls while conducting the wetland delineation along the gas pipeline (SMUD 2002m, Data Response 31), but Energy Commission biology staff also requested that SMUD conduct a CDFG protocol (1995) level survey (CEC 2001c, Data Request 31). SMUD's Biological Resources Assessment states that protocol level surveys were completed for the project site and

laydown area (SMUD 2002z, p. 18), but protocol level surveys along the gas pipeline have not been conducted.

The recommended survey protocol (CDFG 1995) has 3 phases; 1) habitat assessment, 2) burrowing owl and burrow surveys, census and mapping, and 3) resource summary. Surveys should be conducted during the nesting season (April 15 to July 15) as well as the wintering season (December 1 to January 31). Surveys should be conducted out to 500 feet from the impact zone. Burrowing owl burrows are considered occupied if burrows have been used in the last three years (CDFG 1995).

At least one pair of burrowing owls is located along the proposed pipeline route that may be impacted by gas pipeline construction and burrowing owl pellets were located near the northern edge of the CPP site. Staff has asked SMUD (January 24, 2002 workshop) for a figure that depicts the areas where small mammal burrows are located based on survey results. The information and figures (SMUD 2002z, Figures 1-9) provided in the Biological Resources Assessment were based on CNDDDB records and does not include survey results. Wintering burrowing owls within 160 feet of, and nesting burrowing owls within 250 feet of CPP construction activities would be significantly impacted by project activities. Until SMUD submits information on where potential burrowing owl burrows are located and completes a protocol level survey for the gas pipeline, staff does not have adequate information to completely assess impacts to burrowing owls.

Swainson's Hawk: The Swainson's hawk is a state-listed threatened species. Significant impacts to nesting Swainson's hawks would occur if construction activities occur within 0.5 mile of a nest, as this can cause nest abandonment or forced fledging. Impacts would also occur if nest trees were trimmed or removed. Swainson's hawk nest sites are considered active if they have been used in the last 5 years as determined by CDFG nesting records or other confirmed sources (CDFG 1994). There are approximately 13 potential nest sites along the gas pipeline based on surveys reported by SMUD (SMUD 2002z, Data Response 204) and CDFG (CDFG 2002a). SMUD has provided the information to staff in a report but has not provided the locations in a figure, so it is unclear how close the nests are to the actual gas pipeline alignment. The information provided to staff in the Biological Resources Assessment Figures 1- 9 was based on CNDDDB records and did not include survey results. Construction activities within 0.5 mile of a nest tree would result in significant impacts to nesting pairs.

Other migratory birds and raptors: The Migratory Bird Treaty Act and Fish Game Code protect other migratory birds and raptors (listed in **Biological Resources Table 1**). Some species have potential nesting and/or foraging habitats in areas that would be impacted by construction activities at the CPP site and the linear facilities. Birds such as greater sandhill cranes may also be temporarily impacted by the gas pipeline construction through the Cosumnes River Preserve. Activities resulting in take or needless destruction of nests or eggs of any protected bird would have significant impacts.

Impacts from Emissions and Operations

Operations of the proposed project would result in air emissions, noise, and light, all of which may result in impacts to biological resources at the site and in adjacent areas. There is also the potential of electrocution hazards and avian collisions with the heat recovery steam generator HRSG stacks (165 feet in height) and transmission lines (125 feet in height) (SMUD 2001a, Figure 5.3-4a; SMUD 2002j, Figure 2.2-2R).

Noise

Although the area surrounding the proposed CPP is relatively undeveloped, background noise is generated from agricultural activities and the Rancho Seco Nuclear Facility. Background noise measurements taken approximately 800 feet to the west of the project measured 39 dBA (decibels) on average for nighttime measurements (SMUD 2001a, page 8.5-8).

Project construction would result in a short-term temporary increase in the ambient noise level from the use of construction equipment. The increases in noise would be primarily experienced close to the noise source. Dump trucks, backhoes, jack hammers and rock drills have the highest noise level. Pile drivers can be as noisy as 104 dBA, but SMUD does not anticipate using them (SMUD 2001a, AFC Figure 8.5-10, 11). On site near the construction equipment, noise could be as high as 98 dBA. SMUD has not submitted the noise levels for HDD, which would continue 24 hours a day until completed. Once construction is complete noise levels would return to ambient levels.

SMUD has proposed noise control equipment as part of the facility's design. At a distance of about 1,000 feet from the CPP site, the plant noise level would be about 56 dBA (SMUD 2001a, AFC page 8.5-14). For a complete analysis of noise, see Section 8.5 of the AFC (SMUD 2001a) and the **Noise and Vibration** section of this Preliminary Staff Assessment.

Increases in noise could result in indirect impacts to sensitive species from nest abandonment, interrupting foraging behavior, or discouraging animals from using the project site vicinity (Knight 1995) and result in adverse impacts to the species. Of the species listed in **Biological Resources Table 1**, bird species that use the site for foraging or nesting habitat would be most likely be impacted from exposure to increased noise during construction and operation. Loss of foraging and nesting habitat for bird species, as well as impacts to western burrowing owls that may abandon nests up to a distance of 250 feet (CDFG 1995) from noise at the project site would result in significant impacts.

Air Emissions

Air emissions from the HRSG stacks would not have a significant effect on surrounding vegetation and soils. Pollutants emitted from the stacks include carbon monoxide (CO), oxides of nitrogen (NO_x) and sulfur dioxides (SO₂), and inhalable particulates (PM₁₀) (SMUD 2001a, AFC page 8.1-28). The maximum 1-hour CO emissions of 917.7 micrograms per cubic meter (µg/m³) predicted from the stack combined with the maximum 1-hour CO background air concentration of 9,200 µg/m³ results in a total predicted 1-hour concentration of 10,118 µg/m³. This is below ambient air quality

standards (23,000 $\mu\text{g}/\text{m}^3$) and below concentrations known to result in growth retardation in plants (115,000 $\mu\text{g}/\text{m}^3$) and below the concentration found to result in slight reduction of nitrogen fixation (113,000 $\mu\text{g}/\text{m}^3$) (SMUD 2001a, page 8.2-40).

The maximum annual average of SO_2 concentrations estimated for this project (0.03 $\mu\text{g}/\text{m}^3$) is lower than the thresholds for chronic plant injury estimated at 130 $\mu\text{g}/\text{m}^3$ (SMUD 2001a, page 8.2-40).

The maximum predicted annual average of NO_x emissions for this project (0.24 $\mu\text{g}/\text{m}^3$) is lower than the 219.0 $\mu\text{g}/\text{m}^3$ threshold limits that can cause decreases in dry weight and leaf area on plants (SMUD 2001a, page 8.2-40). Maximum annual sulfur and nitrogen concentrations modeled at the Desolation and Mokelumne Wilderness Areas are below the Prevention of Significant Deterioration (PSD) Class I Wilderness Area increments (SMUD 2001a, page 8.1-42).

The maximum annual predicted concentration for PM_{10} from the CPP is 0.20 $\mu\text{g}/\text{m}^3$. Combined with the maximum ambient background concentration of 21.3 $\mu\text{g}/\text{m}^3$ measured in the project area, this would result in a total impact of 21.5 $\mu\text{g}/\text{m}^3$ (SMUD 2001a, page 8.1-40).

There are no sensitive habitats in the area such as serpentine grasslands that would be impacted by a slight increase in nitrogen deposition. Staff believes that air quality impacts to biological resources would be less than significant.

Avian Collision and Electrocution

Bird collisions with electric transmission lines, transmission line ground wires, and exhaust stacks can result in significant bird losses when these structures are located in areas where suitable habitat attracts bird populations. Most bird collisions occur during migration in inclement weather. The mine-tailing pond and Rancho Seco Reservoir contain open water that may be used by low-flying flocking bird species. Construction of the proposed CPP would not increase the chances of collision with power plant-related facilities. The mine-tailing pond and reservoir are close to the site, but are not situated in a location that would increase collisions or electrocutions with the power plant related facilities.

The CPP transmission lines, if not constructed according to current guidelines, have the potential to cause a significant increase in collision and electrocute of birds. Installation of transmission lines and construction of the transmission line towers according to the guidelines suggested by the Avian Powerline Interaction Committee (APLIC 1994 and 1996), would greatly reduce the likelihood that birds would collide with or be electrocuted by transmission lines.

CUMULATIVE IMPACTS

Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of

who is responsible for such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

LOSS OF HABITAT

Much of the vernal pool and annual grassland habitats in the Central Valley has been lost due to agricultural practices and urbanization. The Sacramento and Elk Grove urban areas are both expanding. There is also an increase in vineyards in the areas near SMUD's property. As vineyards are planted annual grassland and vernal pool habitats are converted to agriculture they lessen the overall biological diversity of the region. Because of the ongoing conversion and impacts, it is important to mitigate for the sensitive species habitat that is lost and to reduce impacts to less than significant levels.

WATER USE

Water is an important resource in California, which is allocated to many beneficial uses including but not limited to agriculture, industry, municipal, the environment, and recreation. As water is allocated to agriculture and the growing population, less water remains in rivers to be utilized by fish and wildlife. All of the major rivers in California except for the Cosumnes River are dammed, which limits the amount of fish spawning habitat available for reproduction. The Lower American River is designated as a fully appropriated stream system by the SWRCB (WR Order 98-08), which means that all the water in the river is allocated. Folsom Reservoir does not have a large cold water pool to draw from and hence Lower American River water temperatures can become increasingly warm in the summer and fall, which has a negative impact on fisheries in the river. Through water conservation and the use of best available technologies, impacts to cold and warm water fisheries habitat can be lessened.

When the USBR renews contracts for Lower American River flows they will consult with the NMFS through Section 7 of the Federal Endangered Species Act. Through the consultation process, impacts to fisheries will be addressed and mitigation will be assessed to address significant impacts to Essential Fish Habitat. The Central Valley Project Improvement Act of 1992 (CVPIA) also increased the amount of water that was allotted to the environment. Through the Anadromous Fish Restoration Program (AFRP), goals were set to increase salmon populations throughout the Central Valley of California.

SMUD could lessen its contribution to the cumulative impacts to the Lower American River by using reclaimed water instead of fresh in-land water. In addition, in the event that the USBR is unable to make the full deliveries, SMUD would have a water source that would allow it to continue producing power.

East Bay Municipal Utility District (EBMUD) has pre-1914 water rights on the Lower American River that were largely unexercised. EBMUD's right to exercise their water rights was challenged in court, in part, due to impacts on biological resources. As a result, EBMUD recently changed their project. EBMUD and the County of Sacramento are working on a joint project to divert water near Freeport, on the Sacramento River to the Folsom South Canal, and eventually the Mokelumne River (EBMUD meeting 2002). As a result of the increased impacts to the Lower American River, EBMUD has been

required to change the place of diversion. EBMUD is completing a new Environmental Impact Report and will be consulting with the NMFS to address impacts to fisheries from the diversions.

Until the USBR consultation with the NMFS is completed, there is some uncertainty that the federal contracts can be renewed for the existing amounts, without resulting in a significant impact to fisheries. In conclusion, staff supports SMUD's use of ZLD and the potential use of reclaimed water in Phase 2. Implementing these two measures would help reduce cumulative impacts to the Lower American River to less than significant levels.

MITIGATION

SMUD PROPOSED MITIGATION MEASURES

SMUD has proposed the following best management practices to lessen impacts to biological resources (SMUD 2002z, Biological Resources Assessment).

- Prepare a Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP);
- Provide a Designated Biologist who will oversee compliance with biological mitigation measures and a Biological Monitor who will oversee construction activities, and who will submit daily logs and monthly reports to the Energy Commission;
- Provide a worker environmental awareness training program;
- Implement preconstruction surveys and resource relocation if necessary;
- Designate exclusion zones with fencing that restricts disturbance;
- Require that construction activities be limited to existing roads;
- Allow only authorized vehicles on the project site that have been inspected to ensure fire safety;
- Prohibit camping, firearms, fires, or pets in construction areas at any time;
- Place all trash in closed containers and dispose of daily;
- Prohibit refueling or storage of hazardous materials within 200 feet of flagged sensitive resources, or 100 feet from "waters of the U.S.";
- Prohibit intentional killing or collection of either plants or wildlife;
- Prepare construction monitoring and compliance reports that analyze the effectiveness of mitigation measures;
- When there are open trenches, either cover them at the end of the day, construct egress ramps at either end, and survey prior to construction activities;
- Implement work windows when construction activities are near sensitive species;

- Acquire habitat for vernal pool fairy shrimp and tadpole shrimp with an endowment account. Provide the title to the preserved lands to the Sacramento Trust for Open Lands, or similar third party organization to manage the trust in perpetuity;
- Provide funding and technical assistance to The Nature Conservancy to implement habitat enhancement for giant garter snake within the Cosumnes River Preserve; and
- Implement the conditions in the ACOE Section 404 permit.

Restoration of the Laydown Area

SMUD submitted a draft restoration and revegetation plan for the laydown area. SMUD will mitigate the impacts to the laydown area by revegetating the area to prevent erosion. Native vegetation will be used where possible (SMUD 2002u).

Mitigation for Vernal Pool Plants and Invertebrates

SMUD has identified the USFWS Programmatic Biological Opinion mitigation ratios as guidance for impacts to vernal pool habitat at the project site (SMUD 2002z, Biological Resources Assessment). Those mitigation ratios are:

	Bank	Non-Bank
Preservation (direct and indirect)	2:1	3:1
Creation (direct impacts)	1:1	2:1

SMUD proposes a lesser ratio of 0.2:1 for wetlands that are impacted along the gas pipeline. SMUD believes that the potential recovery rate for vernal pools along the gas pipeline is as high as 90% for pools that have short-term impacts. Therefore, mitigating at a 0.2:1 ratio would mitigate for the 10% loss at a 2:1 ratio.

SMUD also proposes to restore the degraded vernal pools that are located north of the project site and south of the Rancho Seco Nuclear Plant. Restoration of those pools would result in 1.80 acres of restored wetland. In addition to the above compensation, SMUD proposes the following:

- Design the project and pipeline corridor to avoid to the extent possible all vernal pools, man-made ditches, and railroad ditches that could support vernal pool invertebrates;
- Minimize the construction corridor width to avoid vernal pools;
- Conduct preconstruction surveys;
- Implement a storm water pollution prevention plan to reduce the potential for contaminants to enter waters or depressions where vernal pool invertebrates may occur;
- Report the presence of vernal pool invertebrates; and
- Restore the surface topography to preconstruction shape.

Protection of Fish and Aquatic Species in Waterways

SMUD proposes the following protection measures when working in the area of a waterway (SMUD 2002z, Biological Resources Assessment):

- A site specific erosion control and restoration plan;
- The use of HDD for construction of the gas pipeline under the Cosumnes River, Laguna Creek, and Badger Creek. The use of a contingency plan in case a frac-out occurs;
- Silt fencing and other sediment controls;
- Storm water discharge will be discharged under a NPDES permit, issued by the Regional Water Quality Control Board;
- A Biological Monitor will be onsite or on call during the HDD and will assist in monitoring for frac-outs.
- HDD equipment will be located at least 150 feet from the Cosumnes River and Badger and Laguna Creek riparian corridors; and
- Construction under waterways will occur in the dry season, when salmon and steelhead are not expected in the river and creeks and when the giant garter snake is active.

California Tiger Salamander and Northwestern Pond Turtle

- Conduct preconstruction surveys to find individuals and relocate them prior to ground disturbance activities;
- Set up construction zone limits at the creek banks, using silt fencing to restrict access onto construction areas;
- Mark exclusion areas with signs that identify protected habitat;
- Provide a qualified Biological Monitor during construction within potential California tiger salamander and northwestern pond turtle habitat; and
- Monitor storm water discharge from the site for water quality parameters identified in the NPDES permit to protect beneficial uses.

Giant Garter Snake

- Restore temporary impacts to giant garter snake habitat; and
- Monitor for one year post-construction, and report with photo documentation on the progress of restoration.

Swainson's Hawk

- Implement nest surveys within a 0.5 mile of project features in early spring 2003 to determine use by Swainson's hawks if construction during that nesting season is anticipated; and

- If project features are within 0.5 miles of Swainson's hawk nesting, avoid construction if feasible. If construction does occur with 0.25 mile of an active nest consult with the CDFG and have a full time Biological Monitor if required.

Western Burrowing Owl

- Preconstruction surveys would be completed in the spring, to see whether small mammal burrows are occupied by burrowing owls, if construction is planned for that nesting season;
- Protect active nest burrows with a 250-foot buffer during the breeding season (February 1 through August 31) or until young leave the nest;
- Conduct passive relocation prior to construction if winter burrows are found before February 1, and/or restrict construction activities with 150 feet during the non-breeding season; and
- Provide habitat compensation for any active nest burrow that could not be avoided during construction through consultation with CDFG.

Migratory Birds

- Surveys will be conducted within 100 feet on either side of the gas pipeline route;
- Surveys will be conducted in December / January before CPP site construction begins;
- Vegetation will be mowed at the project site and construction lay down area by February 1st to minimize the potential for nests within the construction area;
- Nests that do not have eggs or young will be removed;
- Occupied nests will be relocated, or young will be rehabilitated at an approved rehabilitation center;
- Preconstruction surveys will be conducted for nesting raptors within 500 feet of construction activities; and
- If an exclusion zone cannot be implemented at 500 feet for raptors, then SMUD may: 1) postpone construction in the area until young have fledged, 2) Provide a Biological Monitor and stop construction if it appears that the birds will abandon the nest or young, 3) Consult with the CDFG if construction appears to jeopardize the nesting success and provide for the artificial rearing of eggs or young by qualified staff.

Mitigation for Bird Collisions and Electrocution

SMUD proposes to build the new transmission lines to meet the Avian Power Line Interaction Committee 1996 guidelines (APLIC 1996).

Fisheries

SMUD has proposed a ZLD that eliminates discharges to Clay Creek from the CPP cooling water.

STAFF'S PROPOSED MITIGATION MEASURES

Staff proposes the following additional mitigation measures to reduce impacts to less than significant levels.

Habitat Compensation

To mitigate the loss of annual grassland habitat for foraging and nesting birds and aestivating California tiger salamanders to a less than significant level, habitat compensation shall be required (**Biological Resources Table 4**). The CDFG recommended (1994) Swainson's hawk foraging habitat replacement ratio is 0.75:1 for areas where nests are further than one mile away from construction activities. However there are other sensitive species discussed in the Impacts section that use the site. Staff recommends that since there is an impact to multiple species that use the site, the annual grassland habitat replacement should be increased to a 1:1 ratio. This would result in no net loss of habitat and would reduce impacts to upland foraging habitat to a less than significant level (see Biological Resources Condition of Certification **BIO-14**).

There is also at least one burrowing owl burrow where pellets were observed that has been recently occupied that would be permanently impacted by construction activities at the power plant project site. CDFG guidelines recommend that for permanent impacts, a minimum of 6.5 acres of habitat be replaced at a CDFG approved mitigation bank. To mitigate for the permanent loss of burrowing owl nesting and foraging habitat, a minimum of 6.5 acres of habitat per pair would be purchased in Sacramento County. To mitigate for the loss of burrowing owl burrows, artificial burrows would be constructed in a 2:1 ratio for occupied burrows and a 1:1 ratio for unoccupied burrows. Construction of artificial burrows would mitigate the loss of burrowing owl burrows to a less than significant level (**BIO-15**).

The compensation ratios for vernal pool habitat and other wetland habitat have not been finalized between Energy Commission biology staff, the USFWS, the ACOOE, and SMUD. At the time of writing this PSA, staff is in discussions with the USFWS and the ACOE about the appropriate compensation ratios. Staff has been notified by the ACOE and the USFWS that this project, including the gas pipeline, would not qualify for a Nationwide Permit, or the Programmatic Biological Opinion. Compensation ratios as high as 10:1 for vernal pool crustacean habitat have been discussed between the USFWS and staff due to the impacts from this project. Staff does not believe that SMUD's proposed compensation ratios mitigate impacts to multi-species habitat to less than significant levels. This is an outstanding issue that staff is discussing with the wildlife agencies, so staff has not proposed a condition of certification to mitigate the impacts to the loss of wetland and vernal pool habitat. Staff recommends that avoidance be used to mitigate for impacts to the Laguna Stone Lake Preserve, and an alternate route be used (**BIO-12**).

Along the gas pipeline there would be short-term impacts to giant garter snake habitat that requires habitat compensation to mitigate to less than significant levels. SMUD has not proposed habitat compensation for this species. Staff will continue to work with the USFWS and SMUD to adequately address impacts. This is an outstanding issue that staff is discussing with the wildlife agencies, so staff has not proposed a condition of certification to mitigate the impacts to the loss of giant garter snake habitat.

For impacts to upland habitat along the gas pipeline that requires revegetation for giant garter snake, staff proposes that a revegetation and restoration plan containing success criteria be implemented (**BIO-16**). Implementation of the plan would help reduce impacts to upland habitat to less than significant levels.

At this time, staff has not included habitat compensation ratios for giant garter snake habitat, vernal pools, and wetlands due to the uncertainty of the amounts of impacts that the CPP project would have, as described above. Impacts to these habitats are at significant levels and could not be fully assessed in this PSA due to unresolved issues. Mitigation will be included in the FSA.

**Biological Resources Table 4
Habitat Compensation Acreage Required for the Project**

	Giant Garter Snake Habitat	Vernal Pool Invertebrate Habitat	Wetland Habitat	Burrowing Owl Habitat	Upland Foraging Habitat
Permanent	unknown	unknown	unknown	Per occupied burrow	53.35
Temporary	unknown	-	-	-	-
TOTAL	unknown	unknown	unknown	≥ 1	53.35
Compensation Ratio	1:1	unknown	Unknown	6.5 acres/ occupied burrow	1:1
Compensation Acres Required	unknown	unknown	Unknown	≥ 6.5 acres	≥ 53.35

Mitigation for Mortality or Injury

Prior to construction of the proposed CPP, a Designated Biologist would be hired. The Designated Biologist would be responsible for preconstruction surveys, monitoring activities during construction, and taking preventative measures to reduce the potential mortality or injury to species occurring at the project site. The hiring of a Designated Biologist with proper qualifications (**BIO-1**), the duties of (**BIO-2**), and the authority outlined in **BIO-3** would help ensure that potential impacts to sensitive species would be addressed.

A Worker Environmental Awareness Program (WEAP) would also be developed and implemented to educate workers about the biological resources at the site, compliance with LORS that protect species, and measures the workers shall take if sensitive species are seen in the project vicinity (**BIO-4**).

A BRMIMP would be developed in consultation with the Designated Biologist, for approval by the Energy Commission Compliance Project Manager (CPM) and would include such things as survey requirements, mitigation measures, permit requirements, contact information, and forms for the logs and reporting non-compliance actions (**BIO-5**).

Heritage Tree Protection

Staff recommends that:

- SMUD survey the Cosumnes River Riparian Corridor for heritage trees and submit the results to the CPM;
- SMUD receive a Sacramento County Heritage Tree permit for activities that may impact heritage trees; and
- SMUD mitigate impacts to heritage trees by avoiding impacts or by paying into the Sacramento County Tree Preservation Fund, as required by the County (**BIO-20**).

Preventative Design Mitigation Features

SMUD has proposed, and staff supports, their preventative design features that help reduce significant impacts to biological resources from the CPP. Staff further recommends:

- The setback identified by SMUD for refueling or storage of hazardous materials be increased from 100 feet to 250 feet from “waters of the U.S.” and also any other wetland to help prevent contamination in the event of a leak;
- SMUD build the transmission lines to meet the recommendations in the Avian Power Line Interaction Committee 1994 and 1996 documents. The 1994 document recommends designs to prevent collision and the 1996 document recommends designs to prevent electrocution (APLIC 1994 and 1996); and
- There are no discharges to Clay Creek (**BIO-12**).

Construction Mitigation Management to Avoid Harassment or Harm

SMUD has proposed, and staff supports, the measures that help reduce significant impacts during construction to biological resources from the CPP (**BIO-13**).

Fisheries

SMUD has mitigated impacts to Clay Creek and downstream to the Cosumnes River by redesigning the CPP to incorporate ZLD.

To mitigate impacts to fisheries from a potential frac-out along the gas pipeline, a contingency plan would be submitted for approval. The contingency plan would be included as part of the BRMIMP and implemented if necessary. The contingency plan would contain success criteria for clean up activities. Implementation would reduce potential impacts from a frac-out to less than significant levels (**BIO-5**).

Valley Elderberry Longhorn Beetle

Staff proposes the following measures to mitigate impacts to the valley elderberry longhorn beetle to a less than significant level:

- Surveys shall be completed at the river crossings where access would be needed in an emergency due to a frac-out. Survey reports should include the branch diameter at ground level and the presence of exit holes on the elderberry plants within 100 feet of construction activities. Without information on how many elderberry plants

are present, the USFWS recommended replacement ratios could not be implemented.

- Identify a conservation area that meets the *USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b).

The USFWS standard conservation guidelines for the VELB are outlined below:

- Avoidance may be assumed only when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level;
- In buffer areas, construction-related disturbance should be minimized, and any damaged area should be restored following construction;
- Fence and flag all areas to be avoided during construction activities. Encroachment on the 100-foot buffer is only allowed by the USFWS;
- Erect signs along the avoidance area that identify the area as endangered species habitat;
- Instruct work crews about the status of the VELB and the need to protect the host plant;
- Elderberry plants that cannot be avoided shall be transplanted. All elderberry plants with one or more stems measuring a 1.0-inch or more at the base will be transplanted to a conservation area. The USFWS can grant exemptions to the transplantation requirements;
- A USFWS qualified biologist must be on-site for the duration of the transplantation;
- Transplantation will occur during the non-growing season, approximately November through the first two weeks in February;
- Follow the USFWS transplantation procedure; and
- Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedling or cuttings at the required ratios in the Conservation Guidelines (USFWS 1999b).

Implementation of the above measures and following the USFWS guidelines would reduce impacts to the valley elderberry longhorn beetle to less than significant levels (**BIO-17**).

California Tiger Salamander and Western Spadefoot Toad

Staff recommends that SMUD complete a second year survey that follows the CDFG guidelines (1997) and submit the results (**BIO-18**).

If breeding ponds are located within the vicinity of the project site and related facilities that would be impacted by construction, habitat replacement would be required as part of the habitat mitigation. Grading and clearing activities would be restricted to the dry season to allow juvenile and adults to migrate from the area (**BIO-13**).

Staff recommends that SMUD set up and conduct a bullfrog eradication program on SMUD owned property where California tiger salamanders are known to occur. The Biological Resources Assessment identifies the created vernal pool area on SMUD property as having larvae in 2002 (SMUD 2002z, Biological Resources Assessment). Bullfrogs are predators of California tiger salamander and western spadefoot toads. Limiting the area that bullfrogs inhabit can increase the available breeding habitat. Implementation of a bullfrog eradication program would help to lessen impacts to breeding California tiger salamanders (**BIO-5**).

Dry season trenching would help lessen impacts in areas where potential breeding pools are present (**BIO-12**). However construction of the CPP would result in an adverse impact to California tiger salamanders that are aestivating in the project area.

Giant Garter Snake

The ACOE, as the federal lead agency, is required to obtain a Biological Opinion from the USFWS, through the Section 7 process that would contain terms and conditions that the applicant would have to abide by, and that would also be contained in the BRMIMP (**BIO-5, BIO-10**). The USFWS has standard avoidance and minimization measures during construction activities in giant garter snake habitat (USFWS 1997, Appendix C) that are provided below. Staff recommends that SMUD implement the following USFWS guidelines to prevent harm:

- The biological monitor will check for giant garter snakes prior to construction activities in areas where they are within 200 feet of any potential aquatic habitat.
- Implementation of the “reasonable and prudent measures” described by the USFWS (1997) are necessary and appropriate to minimize the potential for incidental take of giant garter snakes during the construction of the gas pipeline.
- All construction activity within 200 feet of giant garter snake aquatic habitat will be conducted between May 1 and October 1, the active season for giant garter snakes;
- Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat;
- Construction personnel will participate in a worker environmental awareness program (WEAP) that has been approved by the USFWS, covering topics such as (1) life history (2) habitat that it uses (3) terms and conditions of the Biological Opinion (4) speed limits and potential for road-kill;
- Clearing of vegetation within 200 feet of aquatic habitat will be confined to the minimal area necessary to excavate toe of bank for fill replacement;
- Areas designated for avoidance will be clearly marked as environmentally sensitive and avoided by all construction personnel;
- A qualified biologist will inspect the work area within 24 hours prior to commencement of construction activities. The monitoring biologist will be available thereafter, and if a snake is encountered during construction, the monitoring biologist will have the authority to stop construction until the appropriate corrective action can be taken or it is determined that the snake will not be harmed;

- After construction, any temporary fill or debris shall be removed and disturbed areas will be restored to pre-project conditions according to USFWS guidelines for restoration and or replacement habitat;
- Posted signs will alert workers to the potential presence of snakes;
- Areas disturbed during construction will be revegetated using an erosion control seed mix. Silt fences and erosion control measures will be installed on all disturbed slopes greater than 2:1;
- Restoration of habitat will be monitored for one year following implementation. A monitoring report will be submitted to the USFWS at the end of the first year. Additional plantings will be implemented if sufficient cover is not attained after the first year, and another monitoring report would be turned in at the end of that year and monitoring of the banks will occur until banks are adequately revegetated.

Implementation of the above measures would lessen impacts to individuals to less than significant levels (**BIO-19**).

Northwestern pond turtle

Staff recommends that monitors check the construction sites to make sure that pond turtles would not be impacted by construction. They would also check trenches that turtles can fall into. The Designated Biologist would be required to look for and move northwestern pond turtles during monitoring of construction activities and when looking for giant garter snakes (**BIO-2**).

Western Burrowing Owl

Staff proposes the following additional mitigation measures to lessen impacts to individuals to less than significant levels:

- California Department of Fish and Game (1995) protocol pre-construction surveys will be conducted;
- Surveys will be conducted in grasslands within the project footprint and within suitable habitat 500 feet from the project footprint. Burrowing owl surveys will be conducted at least once between April 15 and July 15 and at least once between December 1 and January 31. All observed burrowing owls and active burrows will be mapped and provided to the CPM;
- Occupied burrows will not be disturbed during the nesting season unless a qualified biologist approved by CDFG, verifies through noninvasive methods that birds have not begun egg-laying or that juveniles are foraging independently and are capable of independent survival;
- Only passive relocation techniques will be used to remove owls from active burrows located within a 250-foot buffer zone from the project footprint during the non-breeding season, following CDFG protocol guidelines (1995);
- When destruction of an occupied burrow is unavoidable, existing unsuitable burrows will be enhanced (enlarged or cleared of debris) or new burrows created by installing artificial burrows at a ratio of 2:1 within suitable habitat adjacent to the buffer zone. When destruction of unoccupied burrows are unavoidable, existing unsuitable

burrows will be enhanced (enlarged or cleared of debris) or new burrows created by installing artificial burrows at a ratio of 1:1 within suitable habitat adjacent to the buffer zone. Artificial burrows will be monitored daily for one week to confirm owl use of burrows before active burrows are excavated.

- When destruction of occupied burrows is unavoidable, to offset the loss of foraging and burrow habitat, a minimum of 6.5 acres of foraging habitat per pair or unpaired resident bird will be set aside and permanently protected. Protected lands will be adjacent to occupied burrowing owl habitat or at a location acceptable to CDFG.

These measures are outlined in **BIO-15** and would reduce impacts to individuals and burrowing owl pairs to less than significant levels.

Swainson's Hawk

In order for SMUD to abide by the California Endangered Species Act, SMUD needs to receive and abide by an Incidental Take Permit from the California Department of Fish and Game (Section 2080.1). The Permit would contain measures to mitigate for the take of individuals (**BIO-7**). The terms and conditions would be included in the BRMIMP (**BIO-5**).

A preconstruction survey shall be conducted within 0.5 mile of the entire length of the gas pipeline and the project site to identify any additional potential nest sites prior to initiation of site mobilization (**BIO-18**).

Any construction activities within 0.5 mile of an occupied nest will be conducted with the Designated Biologist monitoring the nest to assure that construction activities do not impact nesting success (**BIO-13**)

FACILITY CLOSURE

Sometime in the future, the CPP would experience either a planned closure, or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. To address facility closure, an "on-site contingency plan" would be developed by the project owner, and approved by the Energy Commission CPM. Facility Closure mitigation measures would also be included in the BRMIMP prepared by SMUD (**BIO-6**).

CONCLUSIONS AND RECOMMENDATION

CONCLUSIONS

There are still outstanding issues that need to be addressed by SMUD before staff can complete a Final Staff Assessment (FSA) and assess what impacts are expected and whether the impacts to all biological resources can be reduced to less than significant levels with suitable mitigation. The following is a list of outstanding information that needs to be submitted and issues that need to be resolved before staff can complete the FSA.

- Identify the acreage amounts of temporary impacts from construction of the compressor stations;
- A restoration and revegetation plan for the gas pipeline, water pipeline, the access road and the transmission line;
- A revised BRMIMP that incorporates all of the updated mitigation measures that SMUD proposed in the Biological Resources Assessment (SMUD 2002z), the Wetland Delineation Report (SMUD 2002x) and staff's comments;
- A complete Biological Assessment that contains measures to mitigate for all of the impacts to federally-listed species and their habitat, that has been submitted to the ACOE, and accepted by the USFWS and NMFS as complete. Federal Endangered Species Act Section 7 consultation should be initiated prior to issuance of the FSA, and staff would like to receive the draft Biological Opinion before evidentiary hearings;
- A revised pipeline alignment that avoids the Laguna Stone Lake Preserve and a biological survey for the alternate alignment;
- Submittal of a figure and report identifying the locations of potential occupied and unoccupied burrowing owl burrows within 500 feet of any project activities;
- A Streambed Alteration Agreement Application(s) for the 34 crossings that have not been previously submitted, accepted as complete by the CDFG (in addition to the 3 already accepted as complete by the CDFG);
- A Clean Water Act Section 404 Application for a Permit filed and accepted as complete by the ACOE;
- A Clean Water Act Section 401 Application for a permit filed and accepted as complete by the CVRWQCB;
- Submittal of the heritage tree locations to Sacramento County;
- A complete assessment of the wetlands that are located within 250 feet on either side of the gas pipeline, access road, and laydown area. Wetlands should be identified using the methods in the ACOE 1987 manual (staff has been unable to propose a condition of certification with ratios and the acres of habitat impacted to mitigate for impacts to wetlands and vernal pool invertebrates);
- The number and location of elderberry plants that are located along the riparian corridors that were not previously surveyed;
- Noise levels for HDD at the site of the bore;
- Identify where in Sacramento County impacts to burrowing owls would be mitigated and submit the mitigation and management plan to the Energy Commission for the area for approval;
- Identify where in Sacramento County impacts to valley elderberry beetles would be mitigated and submit the mitigation and management plan to the Energy Commission for the area for approval;

- Identify where in Sacramento County habitat compensation will occur for Swainson's hawks, and submit the mitigation and management plan to the Energy Commission for the area for approval;
- Calculate the amount of giant garter snake habitat that will be impacted by construction of the gas pipeline and identify where in Sacramento County habitat compensation would occur for giant garter snakes. Submit the mitigation and management plan for the area for approval (staff has proposed Biological Resources Condition of Certification 19 (**BIO-19**) to provide restoration of giant garter snake habitat, but has not been able to propose a condition of certification establishing ratios for habitat compensation); and
- Identify where in Sacramento County habitat compensation would occur for impacts to vernal pools and wetlands, and submit to the Energy Commission the management plan for the area for approval.

COMPLIANCE WITH LORS

SMUD submitted a proposed schedule, (SMUD 2002a, Data Response 7), to obtain the necessary state and federal permits. This schedule was revised at the workshop on January 24, 2002, and SMUD indicated they would submit all the information the agencies would need to write draft permits in May 2002. However, the information was submitted to the ACOE, USFWS, CDFG, and NMFS the week of June 10, 2002.

The CPP will not qualify for an ACOE 404 Nationwide Permit based on the amount of jurisdictional wetland that will be impacted. The ACOE has stated that an individual permit for the project may take up to one and a half years (Cutler pers. comm.). Staff is unable to conclude that the SMUD project would be in compliance with federal LORS until a Clean Water Act Section 404 permit is obtained from the ACOE (**BIO-11**). SMUD would also have to receive Water Quality Certification under Section 401 of the state Clean Water Act from the CVRWQCB (**BIO-9**). Until SMUD receives the permit they are not in compliance with California state LORS.

Due to the potential impacts to federally-listed species, staff also recommends that before the FSA is completed, a Biological Assessment (BA) be accepted by the USFWS as data adequate and that consultation under Section 7 of the Federal Endangered Species Act be initiated by the ACOE for the proposed project. Staff also recommends that the same guidelines apply to the NMFS Section 7 consultation. NMFS stated they will be formally consulting on this project to address impacts to federally-listed salmon species. Until staff is certain that consultation with both federal agencies has been initiated and Biological Opinions are completed, staff is unable to conclude that the SMUD project is in compliance with federal LORS (**BIO-10**).

SMUD has submitted a Streambed Alteration Agreement (SAA) Application to the CDFG for the gas pipeline crossing at the Cosumnes River Preserve. At the June 12, 2002 workshop, CDFG stated that a SAA application must be completed for any location where potential impacts may occur to any wetted stream channel. SMUD is required by CDFG to submit a SAA application for all of the gas pipeline stream and river crossings, and for the proposed relocation of Clay Creek at the CPP site, and the ephemeral drainages on the laydown area and CPP site. SMUD is also required to

apply for an Incidental Take Permit for Swainson's hawks, and receive a letter of concurrence from CDFG with the federal Biological Opinion for species that are both state- and federally-listed species. Until SMUD submits a complete application for the SAA and for an Incidental Take Permit, staff can not conclude they are likely to be in compliance with California state LORS (**BIO-7** and **BIO-8**).

Staff has spoken with the County of Sacramento Tree Coordinator, and SMUD will have to submit the locations of potential heritage trees to the County for review. A permit and mitigation may be required to comply with the County Tree Ordinance. SMUD is not in compliance with local LORS until a permit is received from the County, or the County determines that a permit is not necessary (**BIO-7, BIO-8, BIO-9, and BIO-10**).

RECOMMENDATION

At this time staff does not have enough information to recommend certification of the CPP. Staff believes that there is still a significant amount of outstanding information necessary and that significant impacts have not been adequately mitigated. When the issues outlined above are resolved, staff will make a determination on the adequacy of mitigation measures and compliance with LORS.

CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall submit the resume, including contact information, of the proposed Designated Biologist to the CPM for approval.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field;
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
3. At least one year of field experience with biological resources found in or near the project area; and

If a Designated Biologist needs to be replaced, then the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any site (or related facilities) mobilization. Site and related facility activities shall not commence until an approved Designated Biologist is available to be on site.

Designated Biologist Duties

BIO-2 The Designated Biologist shall perform the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities:

1. Advise the project owner's Construction/Operation Manager, supervising construction and operations engineer on the implementation of the biological resources Conditions of Certification;
2. Be available to supervise or conduct mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and special status species or their habitat;
3. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
4. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (parking lots) for animals in harms way;
5. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification;
6. Respond directly to inquiries of the CPM regarding biological resource issues; and
7. Check the gas pipeline corridor for giant garter snakes and northwestern pond turtles every day prior to the initiation of construction.

Verification: The Designated Biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted in the Monthly Compliance Reports.

During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report.

Designated Biologist Authority

BIO-3 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist, the project owner's Construction/Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an adverse impact to biological resources if the activities continued;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and
3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the halt.

Verification: The Designated Biologist must notify the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

BIO-4 The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure are informed about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two (2) copies of the WEAP and all supporting written materials prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

The signed training acknowledgement forms shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

During project operation, signed statements for active project operational personnel shall be kept on file for six months, following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-5 The project owner shall submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The final BRMIMP shall identify;

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All biological resources Conditions of Certification identified in the Commission's Final Decision;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;
4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CDFG Incidental Take Permit and Streambed Alteration Agreement and Regional Water Quality Control Board permits;
5. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;
7. All required mitigation measures for each sensitive biological resource;
8. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

9. A detailed description of measures that will be taken to avoid or mitigate temporary disturbances from construction activities;
10. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
11. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
12. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
13. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
14. All performance standards and remedial measures to be implemented if performance standards are not met;
15. A discussion of biological resources related facility closure measures;
16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval;
17. A copy of all biological resources permits obtained;
18. A copy of the Restoration and Revegetation Plan;
19. A copy of the bullfrog eradication program to be implemented for review and approval;
20. A copy of the Sacramento County Tree Preservation and Protection Ordinance permit; and
21. A frac-out contingency plan.

Verification: The project owner shall provide the specified document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM, in consultation with the CDFG, the USFWS and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt.

The project owner shall notify and seek approval from the CPM no less than five working days before implementing any modifications to the approved BRMIMP.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS and appropriate agencies to ensure no conflicts exist.

Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation

measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Closure Plan Measures

BIO-6 The project owner will incorporate into the permanent or unexpected permanent closure plan, and the BRMIMP, measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan will address the following biological resources related mitigation measures (typical measures are):

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all power plant site facilities and related facilities;
3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and
4. Revegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

Verification: At least twelve months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, which is incorporated into the BRMIMP, in a Biological Resources Element. The Biological Resources Element will be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Incidental Take Permit

BIO-7 The project owner shall acquire an Incidental Take Permit from the California Department of Fish and Game (CDFG) (per Section 2081(b) of the Fish and Game Code; California Endangered Species Act) and incorporate the terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Incidental Take Permit.

Streambed Alteration Agreement

BIO-8 The project owner shall acquire a Streambed Alteration Agreement from the CDFG (per Section 1600 of the Fish and Game Code), and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final CDFG Streambed Alteration Agreement.

Regional Water Quality Control Board Certification

BIO-9 The project owner will acquire the Regional Water Quality Control Board Section 401 state Clean Water Act certification, and incorporate the biological resource related terms and conditions into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner will provide the CPM with a copy of the final Regional Water Quality Control Board's certification.

Federal Biological Opinion

BIO-10 The project owner shall provide final copies of the Biological Opinion per Section 7 of the federal Endangered Species Act obtained from the U. S. Fish and Wildlife Service and National Marine Fisheries Service. The terms and conditions contained in the Biological Opinions shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U. S. Fish and Wildlife Service's and National Marine Fisheries Service's Biological Opinion.

U. S. Army Corps of Engineers Section 404 Permit

BIO-11 The project owner shall provide a final copy of the U.S. Army Corps of Engineers Section 404 of the federal Clean Water Act permit. The biological resources related terms and conditions contained in the permit shall be incorporated into the project's BRMIMP.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U.S. Army Corps of Engineers 404 permit.

Preventative Design Mitigation Features

BIO-12 The project owner shall modify the project design to incorporate all feasible measures that avoid or minimize impacts to the local biological resources. These include:

1. Design transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;
2. Avoid wetland loss;
3. Prohibit refueling or storage of hazardous materials within 200 feet of flagged sensitive resources, or 250 feet from "waters of the U.S" or other wetlands;
4. Design and construct transmission lines and all electrical components in accordance with APLIC guidelines to reduce the likelihood of electrocutions and collisions of large birds;
5. Zero discharges to Clay Creek from cooling tower water or storm water;

6. Dry season trenching and grading within potential California tiger salamander habitat;
7. Construct the gas pipeline using an alternative route that does not cross the Laguna Stone Lake Preserve; and
8. Use white non-blinking lights on the project facilities and face lights downwards.

Verification: All mitigation measures and their implementation methods will be included in the BRMIMP.

Construction Mitigation Management to Avoid Harassment or Harm

BIO-13 The project owner shall manage their construction site, and related facilities, in a manner to avoid or minimizes impacts to the local biological resources. Measures will include:

1. Temporarily fence and provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence. The temporary fence will be hardware cloth or similar materials that are approved by USFWS and CDFG;
2. Require that construction activities be limited to existing roads or paved areas;
3. Implement work windows when construction activities are close to sensitive resources;
4. Make certain all food-related trash will be disposed of in closed containers and removed at least once a day. Feeding of wildlife shall be prohibited;
5. Prohibit non-security related firearms or weapons from being brought to the site;
6. Prohibit pets from being brought to the site;
7. Report all inadvertent deaths of sensitive species to the appropriate project representative. Injured animals will be reported to the USFWS and the CDFG and the project owner will follow instructions that are provided by the USFWS and the CDFG;
8. Construction activities within 0.5 mile of an active raptor nest will be conducted with a monitor watching nesting activities. Criteria will be implemented to assess construction activities and their effect on the nesting raptors.
9. Laydown and staging areas near giant garter snake aquatic habitat will be at least 200 feet inland from the banks; and
10. Clearing and grading of the project site will be conducted after the vernal pools and seasonal swales in the vicinity are dry.

Verification: All mitigation measures and their implementation methods will be included in the BRMIMP.

Upland Habitat Replacement

BIO-14 To compensate for impacts to upland foraging habitat for Swainson's hawks the project owner shall purchase a minimum of fifty-three and thirty five hundredths of an (53.35) acre of replacement habitat at an approved mitigation bank in Sacramento County. The upland habitat will be purchased to replace loss of foraging habitat for Swainson's hawks. The project owner shall provide additional monetary funds for long-term management and monitoring of the protected lands as necessary based on the Center for Natural Lands Management Property Analysis Record, or similar cost analysis program.

Verification: The project owner shall identify the mitigation bank in their BRMIMP for approval by the CPM. Fifteen (15) days prior to site or related facilities mobilization, the project owner shall provide a copy of the check to the CPM. At the same time the project owner shall also provide a letter from the approved land management organization stating the amount of funds received, and the amount of acres purchased in long term management.

Burrowing Owl Habitat and Burrow Replacement

BIO-15 To compensate for permanent impacts to upland foraging habitat and/or occupied burrows at the site and related facilities, the project owner shall purchase a minimum of 6.5 acres of foraging habitat per pair or unpaired resident bird at an approved mitigation bank in Sacramento County. The project owner should provide additional monetary funds for long-term management and monitoring of the protected lands as necessary based on the Center for Natural Lands Management Property Analysis Record, or similar cost analysis program or similar cost analysis program. The project owner shall also provide artificial burrows at an approved location in a 2:1 ratio for occupied burrows and 1:1 ratio for unoccupied burrows for all potential burrows that will be destroyed from project activities.

Verification: The project owner shall identify the mitigation bank and the location that burrows will be built in their BRMIMP for approval by the CPM. Fifteen (15) days prior to site or related facilities mobilization the project owner shall provide a copy of the check to the CPM. At the same time the project owner shall also provide a letter from the approved land management organization stating the amount of funds received, and the amount of acres purchased in long term management.

Revegetation and Restoration Plan

BIO-16 The project owner shall submit a Revegetation and Restoration Plan for the laydown area and all of the project linear facilities that includes seed mixes and success criteria for restoration of the upland foraging habitat disturbed during construction activities.

Verification: The Revegetation and Restoration Plan will be included in the BRMIMP for approval by the CPM.

Valley Elderberry Longhorn Beetle

BIO-17 The project owner shall conduct the following:

1. Survey and report the branch diameter at ground level and the presence of exit holes on the elderberry plants within 100 feet of construction activities and where the gas pipeline wetland crossings will take place.
2. Identify a conservation area that meets the *USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999b).
3. Follow the USFWS (1999) standard conservation guidelines for the valley elderberry longhorn beetle.

Verification: Survey results will be submitted to the CPM 90 days prior to site or related facilities mobilization. The project owner shall also submit the name of a conservation area and a mitigation plan as part of the BRMIMP.

Surveys

BIO-18 The project owner shall conduct the following surveys:

1. California tiger salamanders and western spadefoot toads surveys will be conducted the season prior to site or related facilities mobilization.
2. Western burrowing owl surveys within a 500-foot buffer to the project site and all related linear facilities according to CDFG protocol (1995) will be conducted no more than thirty (30) days prior to site mobilization. Known occupied burrows will be identified and mapped. Monitoring of the active nests will be conducted by the Designated Biologist throughout the initial construction season to identify additional losses from nest abandonment.
3. Pre-construction Swainson's hawk surveys will be conducted out to 0.5 mile from project related facilities. All nests will be mapped within the 0.5 mile construction buffer. Surveys will be conducted no more than thirty (30) days prior to the start of site mobilization. If active nests are found, they will be monitored according to CDFG guidelines (1994).
4. Pre-construction surveys for nesting birds, including raptors, will be conducted out to a 500-foot buffer from the project site and all related facilities not more than thirty (30) days or less than five (5) days prior to site or related facilities mobilization. Monitoring of the active nests will be conducted by the Designated Biologist until young birds can independently feed and protect themselves before construction within the 500-foot buffer can begin.
5. A second preconstruction survey for all sensitive biological resources will be conducted within 48 hours prior to clearing or grading activities.

Verification: Within ten (10) days of completion, survey results will be submitted to the CPM. The project owner shall submit with the survey results a list of measures for approval, that shall be taken to protect sensitive species and their habitats found during the surveys.

Giant Garter Snake

BIO-19 The project owner shall implement the following giant garter snake mitigation measures:

1. All areas that are giant garter snake habitat will be restored according to the USFWS restoration and revegetation guidelines (1999).
2. All construction activity within 200 feet of aquatic habitat will be conducted between May 1 and October 1, the active season for giant garter snakes.
3. Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.
4. Clearing of vegetation will be confined to the minimal area necessary to excavate toe of bank for fill replacement.
5. Areas designated for avoidance will be clearly marked as environmentally sensitive and avoided by all construction personnel.
6. Areas disturbed during construction will be revegetated using an erosion control seed mix. Silt fences and erosion control measures will be installed on all disturbed slopes greater than 2:1.
7. All excavation will be monitored and if a giant garter snake is observed, the work will be halted immediately to allow the snake to move out of the area. Work will resume on approval of the designated biologist.
8. Restoration of habitat will be monitored for one year following implementation. A monitoring report will be submitted to the USFWS at the end of the first year. Additional plantings will be implemented if sufficient cover is not attained after the first year, and another monitoring report would be turned in at the end of that year. Monitoring of the banks will occur until banks are adequately revegetated to prevent erosion.

Verification: All mitigation measures and their implementation methods will be included in the BRMIMP.

Heritage Tree Protection

BIO-20 The following measures will be implemented to protect heritage trees:

1. SMUD survey the Cosumnes River Riparian Corridor for heritage trees and submit the results to the CPM;
2. SMUD receive a Sacramento County Heritage Tree permit for activities that may impact heritage trees; and
3. SMUD mitigate impacts to heritage trees but paying into the Sacramento County Tree Preservation Fund, as required by the County.

Verification: All mitigation measures and their implementation methods will be included in the BRMIMP.

REFERENCES

- ACOE (U.S. Army Corps of Engineers). 1996. Habitat Mitigation and Monitoring Proposal Guidelines. October 25, 1996. pp. 22.
- APLIC (Avian Powerline Interaction Committee). 1994. Mitigating Collisions With Power Lines: the state of the art in 1994. Edison Electric Institute. Washington D.C.
- APLIC (Avian Power Line Interaction Committee). 1996. Suggested practices for raptor protection on power lines: the state of the art in 1996. Edison Electric Institute. Washington D.C.
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CULTURAL RESOURCES

Judy McKeehan

INTRODUCTION

This cultural resources analysis identifies potential impacts of the proposed Cosumnes Power Project to cultural resources which are defined under state and federal law. The definition is provided in the Laws, Ordinances, Regulations, and Standards (LORS) section of this document. The primary concern in this analysis is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below a level of significance under the California Environmental Quality Act.

Staff provides a cultural overview of the project, as well as a California Environmental Quality Act (CEQA) criteria based analysis that assesses potential project related impacts. If cultural resources are identified, staff determines whether there may be a project related impact to identified resources and if the resource is eligible for the California Register of Historic Resources (CRHR) or the National Register of Historic Places (NRHP). If eligible, staff recommends mitigation to ensure that no significant impacts would occur and that will reduce impacts to the cultural resource to a less than significant level.

There is always a potential that a project may impact a previously unidentified resource or an identified resource in an unanticipated manner. Staff therefore recommends procedures in the conditions of certification that mitigate these potential impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

- Code of Federal Regulations, 36 CFR Part 61. Federal Guidelines for Historic Preservation Projects: The U.S. Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by federal agencies, such as the U.S. Forest Service, the Bureau of Land Management, and the National Park Service. The State Historic Preservation Office refers to these standards in its requirements for mitigation of impacts to cultural resources on public lands in California.
- National Historic Preservation Act, 16 U.S.C. § 470, commonly referred to as Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning. Implementing regulations revised in 1997 (36 CFR Part 800 et. seq.) set forth procedures to be followed for determining eligibility of cultural resources, determining the effect of the undertaking on the historic properties, and how the effect will be taken into account. The eligibility criteria and the process are

used by federal agencies. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historical Resources.

STATE

- California Code of Regulations, Title 14, section 4852 defines the term "cultural resource" to include buildings, sites, structures, objects, and historic districts.
- Public Resources Code, Section 5000 establishes a California Register of Historic Places; determines significance of and defines eligible resources. It identifies any unauthorized removal or destruction of historic resources on sites located on public land as a misdemeanor. It also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and establishes the penalty for possession of such artifacts with intent to sell or vandalize them as a felony. This section defines procedures for the notification of discovery of Native American artifacts or remains, and; states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.
- The California Environmental Quality Act (CEQA) (Public Resources Code, section 21000 et seq.; Title 14, California Code of Regulations, section 15000 et seq.) requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.
- Public Resources Code section 21083.2 states that the lead agency determines whether a project may have a significant effect on "unique" archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses excavation as mitigation; limits the Applicant's cost of mitigation; sets time frames for excavation; defines "unique and non-unique archaeological resources;" and provides for mitigation of unexpected resources.
- Public Resources Code section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines a "historic resource" and describes what constitutes a "significant" historic resource.
- CEQA Guidelines, Title 14, California Code of Regulations, section 15126.4(b), prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.
- CEQA Guidelines, section 15064.5 defines the term "historical resources," explains when a project may have a significant effect on historic resources, describes CEQA's applicability to archaeological sites, and specifies the relationship between "historical resources" and "unique archaeological resources."

- Penal Code, section 622 1/2 states that anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.
- California Health and Safety Code, section 7050.5 states that if human remains are discovered during construction, the project owner is required to contact the county coroner.

LOCAL

County Of Sacramento

The Sacramento County General Plan Conservation Element (December 15, 1993) contains goals, objectives and policies for the preservation and protection of historical and cultural resources throughout the County. Its goal is to promote the inventory, protect, and interpret the cultural heritage of Sacramento County, including historical and archaeological settings, sites, landings, features, artifacts, and/or areas of ethnic, historical, religious, or socio-economic importance. Section VI describes policies and programs under six objectives to accomplish this goal. A summary of the objectives follows:

- Attention and care that ensure that cultural resource sites are protected with sensitivity to Native American values.
- Structures with architectural or historical importance preserved to maintain exterior design elements.
- Protection of known archaeological sites.
- Knowledge of cultural resource site locations.
- Properly store and classify artifacts for ongoing study.
- Public awareness and appreciation of visible and intangible historic and cultural resources. (County of Sacramento 1993).

City of Elk Grove

The East Franklin Specific Plan is applicable because the CPP natural gas pipeline would cross the southwest portion of the East Franklin area. This area is within the planning jurisdiction of the newly incorporated City of Elk Grove (City of Elk Grove 2002a). The Plan covers an area of approximately 2,470 acres about two miles west of the center of the City of Elk Grove. The Sacramento County Board of Supervisors originally approved it in 2000 when the area was unincorporated. The City of Elk Grove was incorporated in July 2001 and has subsequently adopted the Plan. Its purpose is to provide direct and comprehensive correlation between land use, public facilities and services necessary for support of land use. (County of Sacramento 2000).

One of the Planning Principles of the Specific Plan is to “recognize the unique, historical character of the Town of Franklin and develop a plan which is sensitive to its preservation and provides compatible land uses.” The Plan area contains approximately eight historic homestead sites: three are active dairies; two are abandoned dairies; and three are homestead sites that appear more farming-related. The East Franklin Specific Plan provides for the protection of the integrity of the Grant, Rusmore and Benedict homesites and for the preservation of the Jungkeit Dairy residence. (City of Elk Grove 2000.)

Yolo County

The Yolo County Code provides standards for designation of historic landmarks and historic districts. It also provides procedures recommending historic landmarks and historic districts to the Historic Preservation Commission (Yolo County 2002, p. 257).

ENVIRONMENTAL SETTING

The project area is located within the Central Valley of California, a huge alluvial basin 400 miles long and 50 miles wide that is characterized by broad alluvial plains dominated by annual grasslands and fresh emergent wetland habitats. The project lies within Sacramento County, about 25 miles southeast of the city of Sacramento, adjacent to the Rancho Seco Nuclear Plant site.

The proposed power plant, associated fuel, water, and electrical transmission lines, would be located on SMUD's 2,480-acre property in Section 29, Township 6N, Range 8E, Mount Diablo Base and Meridian. Clay East Road borders the project site to the south and Twin Cities Road (State Route 104) is the closest road to the north and west.

The proposed natural gas line would extend approximately 26 miles from the network tap point at the Carson Ice-Gen Project to the CPP site. A compressor station is planned for a location on County Road 29 near Winters, California, in Yolo County. The Winters compressor station would be installed within the existing fenced inter-tie station. An additional compressor station would be installed at the existing compressor station within the Sacramento Regional Wastewater Treatment Plant buffer lands within the existing fenced valve station. Additionally, three valve stations would also be located in three areas along the proposed gas line route as part of the CPP project (SMUD 2002p, p. 1-1 and 1-2).

The proposed transmission line corridor would be 50 feet. It would extend from the CPP switchyard to the existing Rancho Seco switchyard. There would be two sets of three poles each. Pole foundations would be 6 feet in diameter and 20 feet deep (SMUD 2002p, p.1-3).

An approximately 0.4 mile long water line would extend from the CPP to an existing Rancho Seco line.

Refer to the **Project Description** section of this Preliminary Staff Assessment for additional information and maps of the project development region and the project area.

PREHISTORIC SETTING

The project area and the greater Sacramento Valley have been occupied for about 12,000 years, although only a few archaeological site have been found that date earlier than 5,000 years ago. The probable reason for this is that much of the evidence for human occupation is buried beneath the alluvial sediments that accumulated quickly (as much as 30 feet) during that period.

Three general patterns of prehistoric resource exploitation have been identified for the area. During the time period between 2500 B.C. to A.D. 1500, the Windmill Pattern was a seasonal hunting/gathering economy characterized archaeologically by projectile points, fishing hooks and spears, groundstone, and the remains of a wide variety of fauna and fish. Over a period of 1,000 years, that pattern evolved into a more specialized adaptive pattern called the Berkeley Pattern that demonstrates a shift to a greater reliance on acorns and shellfish as demonstrated by the use of mortars and pestles and the presence of shell mounds. The Augustine Pattern reflects development of social organization and stratification demonstrated by mortuary ritual, sedentism, population growth and beads as monetary exchange after A.D. 500 (SMUD 2001a, p. 8.3-9 to 8.3-12).

ETHNOGRAPHIC BACKGROUND

The project area was inhabited by the Eastern Miwok, a subfamily of the Utian family, Penutian stock. The Eastern Miwok once contained seven language divisions and five separate groups. The project area falls into the Plains Miwok subdivision that occupied the lower Mokelumne and Cosumnes rivers and the Sacramento River from Rio Vista to Freeport. As known mostly from Spanish mission records, diaries, and journals, the Plains Miwok relied on the resources of the Delta and surrounding areas for food and material needs. Acorns were the primary food staple, supplemented by large game, waterfowl, fish, and shellfish. Trade with coastal groups and mountain tribes is indicated by obsidian, steatite, and shell. Social structure centered around tribelets associated with central permanent settlements on high ridges or knolls, or on Delta islands (SMUD 2001a, p. 8.3-12, 8.3-13).

HISTORIC SETTING

The first documented European presence in the Sacramento Valley was by the Spanish explorer Pedro Fages in 1772. Spanish Colonel Juan Bautista De Anza and a party of Spanish settlers, soldiers, and Franciscan Fray were sent to Monterey to establish a mission. They traveled through the Bay Area in 1776. Spanish explorer Lieutenant Gabriel Moraga's caravan crossed the Mokelumne, Cosumnes, and American rivers and explored the Feather River in 1808 while looking for suitable mission locations and capturing runaway Mission Indians. The first river-based expedition took place along the San Joaquin and Sacramento rivers by Spanish explorers in 1811. The last, and most substantial Spanish exploration in the area occurred in 1817 when Luis Arguello, then commander of the San Francisco Presidio, traveled up the Sacramento River and on to the Feather River.

The Mexican revolt of 1822 brought an end to colonization through coastal mission building and began an emphasis on establishment of extensive land grants that included interior California. American trapper and explorer, Jedediah Smith explored the western Sierra Nevada and foothills starting in 1826, trapping in and around the Sacramento Valley in 1827. Large Mexican land grants were issued to John Sutter who founded New Helvetia in 1838. During the mid 1840s ranchos were granted around Sloughhouse, the Cosumnes River, modern Elk Grove, and the existing Rancho Seco Plant. Jackson Road was established as the main route between the Cosumnes River and Sacramento in 1848. The European population in the Sacramento Valley boomed in the early 1849 with the discovery of gold, just subsequent to the decimation of the

indigenous population by epidemics of disease. California became a state in 1850, following the end of the Mexican war in 1848 and the Treaty of Guadalupe Hidalgo that ceded the territory of California to the United States.

A stage line that followed Laguna Creek to the Stockton road served as the main transportation route in the local area in the 1860s and 1870s. The Central Pacific Railroad completed a line to transport coal mined in adjacent Amador County in 1877 and used surrounding land grant property to graze cattle. Farming was started to supply stock feed and grew to include fruit orchards, hops production and vineyards during the early 20th century. Agriculture has dominated the project area since that time. In 1966 SMUD began construction of the Rancho Seco Plant and operations began in 1972. The power plant was closed by the voters of Sacramento County in 1989, after a controversial history of operation (SMUD 2001a, p. 8.3-13, -15).

RESOURCES INVENTORY

Literature and Records Search

Prior to preparation of the AFC, the applicant conducted literature searches and cultural resources inventories within ½-mile of the project site and linear facilities through the Archaeological Information Center of the California Historic Resources Information System (CHRIS). The record searches identified three previously known/recorded prehistoric sites, fourteen historic archaeological resources and one site with historic and prehistoric components within ½-mile of the proposed project. No Native American traditional cultural properties were identified. The applicant also identified several areas as “high probability areas” where there is a high probability of encountering subsurface cultural resources.

Only one potential archaeological resource was identified within the vicinity of the proposed project site. This potential site was previously the subject of controversy. Expert opinions differed and the final opinion was that the location was probably not a site. The potential cultural resource was recorded with the CHRIS as ARS-85-15-1 (SMUD 2001a, Confidential Filing, p.12).

In July 2002, a concerned member of the lone Band of Miwok, Randy Yonemura, identified thirteen additional locations of potential cultural resource sites for SMUD (SMUD 2002r).

Field Surveys

The applicant carried out a cultural resources field reconnaissance survey of the proposed power plant site in March 2001 and of the previously unsurveyed sections of the gas line route in the vicinity of the project in July 2001 (SMUD 2001a, p.17).

The March 2001 reconnaissance survey did not find any material at the previously recorded location of ARS-85-15-1. The surveyors did identify two potential historic period sites, a ranch related site recorded as CA-SAC-504H and historic period dredge tailings recorded as site CA-SAC-500H. It does not appear that the project would impact any of these potential cultural resources (SMUD 2001a, Confidential p.12-15). The waterline was included in the area surveyed in March 2001. The cultural resources

survey conducted in January 2002 identified a circular feature believed to be a placer mining depression in the project site vicinity. No artifacts were associated with this depression (SMUD 2002f Confidential p. CR41-6). The project would also avoid this potential cultural resource.

One new potential archaeological site was identified along the proposed gas line route. This site was later recorded and assigned the trinomial CA-SAC-526/H by the CHRIS.

Between January 23 and January 26th, 2002, the valve stations, compressor stations, construction access road and transmission corridor were surveyed. This survey included the proposed compressor station located in Yolo County, near Winters. No cultural resources were identified as a result of this survey (SMUD 2002p).

A proposed access road to be located north of Clay East Road will extend approximately 3,200 feet to a paved road. This location was surveyed in April of 2002 and no cultural resources were identified (SMUD 2002p, p. 3-3).

On June 25, 2002, SMUD surveyed an additional eleven miles of proposed pipeline route. The route had been previously surveyed in 1980. The survey began several hundred feet south of Dwight Road and ended at Eschinger Road. An additional segment of the survey began at Laguna Road and extended approximately 1.8 miles along the pipeline route. For the most part, the survey extended 30 feet from the centerline of the proposed route. In one section, the survey extended 60 feet from the proposed centerline of the gas line route. This survey included the area of a route change that had not been previously surveyed. The route change encompassed a corridor from Core Road to Eschinger Road. The results of the survey were negative for cultural resources along the entire survey route (SMUD 2002r).

Potential laydown area A was surveyed in March 2001 and again in January 2002. No cultural resources were identified during either survey (SMUD 2002f p. CR41-4 to 5). Potential laydown area B and C were surveyed in January 2002. Two features that appear to be placer mining holes were recorded. Three features that appear to be a combination of mining activity and historic debris were identified in proposed laydown area C. All the identified features would be part of "no construction-related activity" areas and would be avoided by the project (SMUD 2002f, p. CR41-7).

In response to a data request, the applicant provided Department of Parks and Recreation (DPR) form 523s for buildings and other resources within 100 feet of the proposed gas line. JRP Historical Consulting Services compared locations on historical maps to potential resources identified during a windshield survey. Caltrans Bridge lists were also checked. Additional fieldwork included field recordation of potential cultural resources and photographs (SMUD 2002e).

Presence/Absence Testing and Remote Sensing

To avoid repetition, the discussion of presence/absence testing and remote sensing is in the impacts/analysis section of this document.

Native American Contacts

Consultation with concerned Native Americans is essential to identification of all the cultural resources within a project area. The applicant contacted the Native American Heritage Commission (NAHC) on March 22, 2001 to obtain a list of Native Americans that may have concerns about projects in the Sacramento County area (SMUD 2001a, p. 8.3-23). The applicant sent letters to the Native Americans on the list on May 4, 2001 describing the project and asking about concerns. Two responses were received. The United Auburn Indian Community of the Auburn Rancheria (Miwok/Maidu) reported on May 21, 2001 that the Tribal Historic Preservation Committee had no information regarding sacred sites in the project area. The Lone Band of Miwok Indians reported on June 20, 2001 that the Tribe was unaware of any information regarding existing sites in the area. SMUD representatives met with concerned Native Americans on November 8, 2001, January 15, 2002, and January 26, 2002. At the January 26th meeting, the Native Americans identified and walked potentially sensitive areas with SMUD representatives and the Energy Commission (SMUD 2002e, Attachment CR-53.)

In addition, a letter was received from the Lone Band of Miwok Indians. The letter outlined measures that the Lone Band would like to see implemented. In summary, they requested that a buffer area be created around the Hicksville Cemetery. They also requested that Native American monitors be present during earthmoving activities in culturally sensitive areas. They are willing to participate as Native American monitors. Moreover they would like to see that culturally sensitive areas are clearly marked and would like to have these areas continually monitored during activity in these areas. The Lone Band also suggests that a training plan be developed to educate construction personnel regarding the significance of the culturally sensitive areas and the importance of avoiding these areas. The Lone Band is available to participate in the training program. They also suggest that development of an agreement with the Native Americans that discusses the steps that should be taken if human remains or other cultural material are found. They also want to ensure that sensitive cultural areas are protected during project maintenance (Lone Band of Miwok Indians 2002b).

Moreover, staff has received telephone calls from Billie Blue Elliston and Randy Yonemura. They both expressed concern regarding specific locations along project linears (CEC 2002c and CEC 2002f).

CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES

As described previously, various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the cultural resources and the methods and consultation required to mitigate any such impacts.

The record and literature search and the pedestrian surveys of the proposed project area and linears were conducted to identify the presence of any cultural resource sites or materials. Where resources were identified, additional evaluation was conducted to determine whether the resources are already listed on, or are potentially eligible for listing on, either the National Register of Historic Places (NRHP) or the CRHR. The determination of eligibility is made in compliance with the criteria for the CRHR (CCR

Section 4852). The criteria include (A) Is associated with important historical or cultural events in California. (B) Is associated with the lives of persons important in our past. (C) Embodies distinctive characteristics of a type, period, region or method of construction, or represents the work of an important creative individual or possesses high artistic values. (D) Has yielded or may yield important information in history or prehistory (CCR Section 15064.5).

A subset of cultural resources is historical resources. CEQA Guidelines explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project will affect “historical resources.” The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination. These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project would cause a “substantial adverse change in the significance of the historical resource,” which the regulation defines as a significant effect on the environment. If there is federal involvement in the project, the lead federal agency will ensure compliance with Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470 (36 CFR Part 800 are the implementing regulations of Section 106). They will also determine the eligibility of applicable sites for the NRHP in consultation with the State Historic Preservation Officer (SHPO).

CEQA also contains a section addressing “unique” archeological resources and provides a definition of such resources (PRC, Section 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of a historical resource (Title 14, California Code of Regulations, Section 15064.5). Where staff has determined that the sites for which it is recommending mitigation meet the definition of historical resources, the prohibition does not apply to the mitigation discussed in this staff assessment.

Preliminary evidence from CA-SAC-68 indicates that only historic debris that appear to be less than 45 years old are present. Additional clarification regarding the factors that allowed the investigators to draw that conclusion is necessary. However, it appears at this time, that there are no cultural resources related to CA-SAC-68 along the proposed gas pipeline route.

At CA-SAC-93, additional work will need to be completed by the applicant before staff can conclude that there are no cultural resources in the path of the proposed gas pipeline route in the vicinity of this previously identified site.

To determine whether mitigation is necessary in the area of CA-SAC-526/H and the Hicksville Cemetery, additional work will need to be completed by the applicant following the identification of anomalies during remote sensing (see Impacts section).

Presence/absence testing is planned for the area between CA-SAC-93 and CA-SAC-68. SMUD is planning investigations of sites identified by concerned Native Americans. At this time staff cannot make any conclusions regarding these locations.

IMPACTS

Since project development and construction usually entail surface and subsurface disturbance of the ground, the proposed CPP project has the potential to adversely affect both known and previously unknown cultural resources. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources would not be encountered and that impacts would therefore not occur.

POTENTIAL FOR PROJECT IMPACTS

Because project-related site development and construction would entail subsurface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown subsurface cultural resources.

Four potential historic resources have been identified in the vicinity of the project site. Previously recorded controversial possible archaeological site ARS 85-15-1 could not be identified. Potential historic ranch area CA-SAC-500 and CA-SAC-504 associated with historic mining were located. One feature that appeared to be associated with historic mining activity was also recorded. It appears that all these resources in the vicinity of the project footprint would be avoided by the project.

Since the project can avoid the potential resources evaluation of those potential cultural resources is not necessary.

Along project linears, potential exists for impacts to two archaeological sites, two historic sites, and one newly discovered site that appears to have both a prehistoric and a historic component. Additional information will be provided by the applicant regarding the cultural resources that have a potential to be impacted by the project.

CH2MHill has also identified areas along the proposed gas line route that they consider "high probability areas." The terrain in these areas suggests desirable locations for prior human habitation and the possibility of encountering subsurface cultural resources is increased in these areas.

Presence/Absence Testing For CA-SAC-68 And CA-SAC-93

Presence/absence testing was conducted on June 26, 2002 at previously recorded site CA-SAC-68 to determine whether subsurface archaeological deposits are present. Six 50cm by 50cm were excavated to 40cm deep. Auger testing was then used to reach a depth of 7 ft. Historic debris was identified (bottle glass, brown bottle glass, metal and fragments of metal etc.) in the top 25cm of the excavation. The historic debris was believed to be less than 45 years old. No cultural materials were found below 25cm. Concerned Native Americans from the Miwok Tribe, Randy Yonemura and Lisa Daily, monitored the excavation (SMUD 2002r, p.1-2).

Presence/absence testing was conducted on June 27 and 28, 2002, at previously recorded site CA-SAC-93. The proposed route of the gas line would extend through the site. However, the site is located in agricultural land where plowing activity is thought to have disturbed the surface to a depth of approximately four feet. The purpose of the test was to determine whether a subsurface component to the site still existed and if there was enough of the site left to evaluate for eligibility to the CRHR.

Three test units, 50cm by 50cm, were placed at 50-foot intervals, beginning in the center of the previously identified surface scatter of the site. Auger testing was used to reach a depth of seven feet, the expected depth of the gas line trench. Due to extremely muddy conditions, three additional locations were tested by augering. Native American monitor, Randy Yonemura was in agreement with the decision to auger. Testing was discontinued at the request of the landowner. The test plan identified approximately 2,000 feet to be tested. The testing was completed only over a 300-foot area.

One hundred fourteen (114) nodules and four (4) small chunks of baked clay were identified along with seven bone fragments. No cultural materials were found below the plow zone (SMUD 2002r, p.1-3). Test units 10 and 11 were discontinued at approximately 47 inches and 24 inches due to the presence of hard pan. Concerned Native Americans, Dwight Dutschke and Billie Blue Elliston, visited the presence/absence testing. Dwight Dutschke is a spokesperson for the lone Band of Miwok. Randy Yonemura and Lisa Daily, also from the Miwok Tribe, monitored the presence/absence testing (SMUD2002r, p. 1-4). Additional information is needed before conclusions can be reached regarding the impacts to CA-SAC-93 by the proposed gas line.

There was not time to conduct presence/absence testing in a location situated between CA-SAC-68 and CA-SAC-93. It is still necessary for the applicant to identify whether or not an archaeological site is present in that area.

Remote Sensing

Members of the Native American community expressed a great deal of concern regarding the potential for encountering human burials outside the area identified as the Hicksville Cemetery. SMUD decided to apply remote sensing to the area between the Hicksville Cemetery fence and the fence on the south side of Arno Road, within the road right-of-way. SMUD could not obtain landowner permission to use this technique along the actual proposed gas pipeline route which is south of the Arno Road right-of-way.

The remote sensing was accomplished by Billy A. Silva Sensing Systems using an EG+G Geometrics 858 cesium vapor magnetometer. The G858 magnetometer measures the rates of change of certain atomic structures in the presence of a superimposed magnetic field (SMUD 2002r, p. 2). Remote sensing was used at newly identified site CA-SAC-256/H and the vicinity of the Hicksville Cemetery to identify potential cultural resources and human burials. Anomalies were identified at both locations. The remote sensing report considers the possibility that the presence of anomalies in the vicinity of Hicksville Cemetery may be caused by roadwork or utility lines. The size of the anomalies in the area of CA-SAC-526/H indicates that they may be cultural in origin. The remote sensing operator recommends that augering or some other method of "ground truthing" be used to investigate the identified anomalies (SMUD 2002r).

Randy Yonemura has identified potential locations of additional sites. He has requested that remote sensing be conducted at those locations. SMUD is considering his request.

Native American Concerns

Several representatives of the Native American community have expressed concern regarding the identification and treatment of Native American sites, artifacts, human remains, and other issues. To address these cultural concerns, staff recommends that the applicant keep members of the Native American community informed regarding cultural resource activities for the proposed project. In order that everyone with concerns can participate, staff recommends that Native American monitoring be conducted in a manner that allows more than one person to monitor or that monitoring be conducted on a rotating basis. If some Native Americans are not available to monitor, they may wish to participate by providing comments or information regarding Native American artifacts or sites that are discovered.

Public workshops were held on June 11, 18, and 25, 2002. Portions of the June 11 and June 18 workshops were allotted to cultural resources and cultural resources was the only topic under consideration at the June 25th workshop. Concerns raised at the various workshops included, but were not limited to the usefulness of the proposed site test plan and Native American involvement in the project. Some additional concerns expressed were that all recovered artifacts be returned to the ground, a request for a MOU with Native Americans, the recommendation that remote sensing be used to identify sites and recommendation that a burial plan be developed. Randy Yonemura and Glen Villa Jr., a spokesperson for the Lone Band of Miwok provided concerns in writing.

Native Americans who participated in the workshops included Randy Yonemura and Billie Blue Elliston. Dwight Dutschke, Glen Villa Sr. and Glen Villa Jr. who are spokespersons for the Lone Band of Miwok also attended. The Native American Heritage Commission was represented by Debbie Pilas-Treadway at the June 18th workshop.

CUMULATIVE IMPACTS

Cumulative impacts to cultural resources in the project vicinity may occur if subsurface archaeological deposits (both prehistoric and historic) and the setting of historic structures are affected by other projects in the same vicinity as the proposed project. Residential and commercial development is planned in the vicinity of some parts of the proposed gas line.

However, project proponents for this and future projects in the area can mitigate impacts to as yet undiscovered subsurface archaeological sites to less than significant levels. Impacts can be mitigated by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP).

FACILITY CLOSURE

At the time of planned closure, all then-applicable LORS would be identified and the Energy Commission-required closure plan would address compliance with these LORS. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no conclusion can be drawn at this time with respect to the impact of facility closure on cultural resources. The closure plan, when created, would address impacts to cultural resources.

COMPLIANCE WITH APPLICABLE LORS

Implementation of the Conditions of Certification in this document would ensure that this project complies with all applicable state laws with respect to cultural resources. The County of Sacramento, City of Elk Grove, and Yolo County have specific LORS that apply to cultural preservation.

MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often, however, avoidance cannot be achieved, and other measures such as surface collection, subsurface testing, recordation and data recovery must be implemented for archaeological resources and documentation must be implemented for historical structures. Mitigation measures are developed to attempt to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION

Archaeological Resources

The applicant suggests a six point archaeological monitoring program. They recommend:

- Preconstruction - Conduct a preconstruction assessment and construction worker training.
- Construction Monitoring - An archaeological monitor will be present during construction activity in archaeologically sensitive areas.
- Site Recording and Evaluation - Recording and evaluation if a find is determined to be significant and provide criteria for determining significance.
- Mitigation Planning - Mitigation plan in place to avoid construction delays.
- Curation - arranged with a qualified curation facility.
- Report of Findings - If cultural resources are discovered, a final report will be prepared that addresses cultural the cultural resources activities of the project. The applicant also recommends establishing mitigation for any resources that cannot be avoided and might be impacted by emergency maintenance (SMUD 2001a, p. 26-29).

At the June 25th workshop, the applicant expressed a commitment to avoid archaeological sites that were Native American in origin.

STAFF'S PROPOSED MITIGATION MEASURES

Staff has adapted the portions of the applicant's proposed mitigation measures into a series of conditions of certification, sometimes rewording for clarification, adding time frames, and/or adding other requirements.

The proposed mitigation measures would apply to any potential for impacts to sensitive cultural resources in all areas affected by the project. Mitigation measures are derived from good professional practice and they are based on the U.S. Secretary of the Interior's guidelines. The mitigation measures set forth in the conditions have been applied to previous projects before the Energy Commission and they have proven successful in protecting sensitive cultural resources from construction-related impacts while allowing the timely completion of many projects throughout California. Adoption of staff's proposed conditions of certification is expected to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

If the sites are evaluated as eligible to the CRHR and they would be impacted by the project, it will be necessary to determine mitigation. Mitigation measures are developed to attempt to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

Ordinarily staff includes a condition that requires curation of any artifacts collected as a result of a project. For this project the condition appears as **CUL-3, 6**. At present, based on concerns raised by the Native American community, the content of this

condition is still under discussion. Resolution of issues regarding the curation of artifacts is anticipated prior to publication of the Final Staff Assessment.

CONCLUSIONS AND RECOMMENDATIONS

There is additional cultural information needed before conclusions can be drawn and recommendations can be finalized regarding cultural resources that will be impacted by the CPP. Staff believes that presence/absence testing, remote sensing, and site evaluation, if necessary, should be completed prior to permitting so that staff can recommend appropriate mitigation for sites that might be encountered. Specifically, SMUD should provide the following information to allow staff to complete their analysis and recommend the appropriate mitigation measures and conditions of certification:

- Identification of any additional cultural resources sites and recordation of any potential cultural resources on a DPR 523 form.
- A demonstration of how those sites will be avoided or an evaluation of the cultural resources site for eligibility to the CRHR.
- Information regarding Native American involvement in the project including identification of any sacred sites.
- Results of remote sensing at prospective sites, if not previously provided to the Energy Commission.
- Results of the completion of presence/absence testing agreed upon in the confidential "Cultural Resources Testing Plan for Cosumnes Power Plant, Sacramento County, California.

Although additional information is needed before staff can fully determine impacts and recommend appropriate mitigation, based on the information available, staff recommends adoption of the following conditions of certification. Staff may recommend additional conditions after the applicant provides the additional information.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance, the project owner shall provide the California Energy Commission Compliance Project Manager (CPM) with the name and resume of its Cultural Resources Specialist (CRS), and one alternate CRS, if an alternate is proposed, for approval. The CRS will be responsible for implementation of all cultural resources conditions of certification.

Protocol:

- 1.) The resume for the CRS and alternate, shall include information that demonstrates that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published by the CFR 36, CFR Part 61 are met. In addition, the CRS shall have the following qualifications.

- a. The technical specialty of the CRS shall be appropriate to the needs of this project and shall include a background in anthropology, archaeology, history, architectural history or a related field
 - b. The background of the CRS shall include at least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California;
 - c. The resume shall include the names and phone numbers of contacts familiar with the CRS's work on referenced projects.
- 2.) The resume shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during project ground disturbance, construction and operation.
- 3.) The CRS may obtain qualified cultural resource monitors (CRM) to monitor as necessary on the project. CRMs shall meet the following qualifications.
 - a. A BS or BA degree in anthropology, archaeology, historic archaeology or a related field and one year experience monitoring in California; or
 - b. An AS or AA in anthropology, archaeology, historic archaeology or a related field and four years experience monitoring in California; or
 - c. Enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historic archaeology or a related field and two years of monitoring experience in California.
- 4.) The project owner shall ensure that the CRS completes any monitoring, mitigation and curation activities necessary to this project and fulfills all the requirements of these conditions of certification. The project owner shall also ensure that the CRS obtains additional technical specialists, or additional CRMs, if needed, for this project. The project owner shall also ensure that the CRS evaluates any cultural resources that are newly discovered or that may be affected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR).

Verification: At least 45 days prior to the start of ground disturbance, the project owner shall submit the name and resume of its CRS and alternate CRS, if an alternate is proposed, to the CPM for review and approval

At least 10 days prior to a termination or release of the CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval.

At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum

qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the CRM's qualifications. The letter shall be provided one week prior to the CRM beginning on-site duties.

At least 10 days, prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions of certification.

CUL-2 Prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps will include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall approve all submittals.

If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes, to the CRS and the CPM. Maps shall identify all areas of the project where ground disturbance is anticipated.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the CPM.

At a minimum, the CRS shall consult weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with the maps and drawings.

If this is to be a phased project, the project owner shall also provide to the CRS and CPM a letter identifying the proposed schedule of the ground disturbance or construction phases, and the associated dates for submittal of maps and drawings, along with the initial maps and drawings.

If there are changes to the footprint for a project phase, revised maps and drawings shall be provided to the CRS and CPM at least 15 days prior to start of ground disturbance for that phase. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

CUL- 3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by the CRS, to the CPM for review and approval. The CRMMP shall identify

general and specific measures to minimize potential impacts to sensitive cultural resources.

Protocol:

The CRMMP shall include, but not be limited to, the following elements and measures:

- 1.) A proposed general research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A refined research design will be prepared for any resource where data recovery is required.
- 2.) Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.
- 3.) Identification of the person(s) expected to perform each of the tasks; a description of each team member's qualifications and their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.
- 4.) A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.
- 5.) A discussion of all avoidance measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.
- 6.) A discussion of the requirement that all cultural resources encountered will be recorded on a DPR form 523 and mapped (may include photos). In addition, all archaeological materials collected as a result of the archaeological investigations shall be curated in accordance with the State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections," into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.
- 7.) A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding will be met. Also the name and phone number of the contact person at the institution shall be

included. In addition, include information indicating that the project owner will pay all curation fees and that any agreements concerning curation will be retained and available for audit for the life of the project.

- 8.) A discussion of the availability and the CRS's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.
- 9.) A discussion of the proposed Cultural Resource Report which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CRMMP to the CPM for review and approval. A letter shall be provided to the CPM indicating that the project owner will pay curation fees for any materials collected as a result of the archaeological studies. Ground disturbing activities may not commence until the CRMMP is approved.

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall report on all field activities including dates, times and locations, findings, samplings and analysis. All survey reports, DPR 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) shall be included as an appendix to the CRR.

Verification: The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the curating institution (if archaeological materials were collected), the State Historic Preservation Office (SHPO) and the CHRIS.

CUL-5 Worker Environmental Awareness Program (WEAP) shall be provided, on a weekly basis, to all new employees starting prior to the beginning and for the duration of ground disturbance. The training may be presented in the form of a video. The training shall include:

1. a discussion of applicable laws and penalties under the law;
2. samples or visuals of artifacts that might be found in the project vicinity;
3. information that the CRS, alternate CRS or CRM has the authority to halt construction in the event of a discovery or unanticipated impact to a cultural resource;
4. instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the CRS or CRM;
5. an informational brochure that identifies reporting procedures in the event of a discovery;

6. an acknowledgement form signed by each worker indicating that they have received the training; and
7. a sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The CRS, alternate CRS and the CRM(s) shall have the authority to halt construction if previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner.

If such resources are found or impacts can be anticipated, the halting or redirection of construction shall remain in effect until all of the following have occurred:

1. the CRS has notified the project owner, and the CPM has been notified within 24 hours of the find destination and the work stoppage;
2. the CRS, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
3. any necessary data recovery and mitigation has been completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM with a letter confirming that the CRS, alternate CRS and CRM(s) have the authority to halt construction activities in the vicinity of a cultural resource find, and that the CRS or project owner will notify the CPM immediately (no later than the following morning or the incident, or Monday morning in the case of a weekend) of any halt of construction activities, including the circumstance and proposed mitigation measures.

- CUL-7**
1. The CRS, alternate CRS, or CRM(s) shall monitor ground disturbance full time in the vicinity of the project site, linears and laydown areas, access roads or other ancillary areas to ensure there are no impacts to undiscovered resources or known resources affected in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval.
 2. CRM(s) shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

3. The CRS shall notify the project owner and the CPM within 24 hours, by telephone or e-mail, of any incidents of non-compliance with any cultural resources conditions of certification. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification.

Cultural resource monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a CRM from duties assigned by the CRS or direction to a CRM to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these conditions of certification.

4. A Native American monitor(s) shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Native Americans expressing concern regarding the CPP project shall be provided an opportunity to monitor. This may be accomplished by having more than one monitor on site or by setting up a rotating schedule of monitors. Native Americans who express a wish to participate in the project by providing comments regarding the significance of sites or artifacts shall be contacted so that they can provide information. Preference in selecting monitors shall be given to Native Americans with traditional ties to the area that will be monitored.

Verification: During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval.

During ground disturbance, the project owner shall include in the MCRs copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained on-site and made available for audit by the CPM.

Within 24 hours of recognition of a non-compliance issue, the CRS shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. A report that describes the issue, resolution of the issue, and the effectiveness of the resolution measures shall be provided in the next MCR.

One week prior to ground disturbance, in areas where there is a potential to discover Native American cultural resources, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM who will initiate a resolution process.

REFERENCES

- CEC (California Energy Commission) 2002c. Report of conversation between Dorothy Torres, CEC, and Randy Yonemura, concerned Native American, regarding CA-SAC-93 and SMUD power plant project. March 8, 2002. Docket date March 13, 2002.
- CEC (California Energy Commission) 2002e. Report of conversation between Dorothy Torres and Gary Reinoehl, CEC and Jim Bard and Jim Sharp CH2Mhill regarding proposed presence/absence testing. April 18, 2002.
- CEC (California Energy Commission) 2002f. Report of conversation between Gary Reinoehl, CEC, and Billie Blue Elliston, concerned Native American, regarding Hicksville Cemetery and CA-SAC-93. May 1, 2002.
- County of Sacramento 1993. Conservation Element or the County of Sacramento General Plan. December 15, 1993. Section VI and VII, E. Cultural Resources.
- City of Elk Grove 2000. East Franklin Specific Plan. Adopted April 2000.
- SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.
- SMUD (Sacramento Municipal Utility District) 2001c. Revised Application for Confidential Designation of 1) sources and pricing of air emission reduction credits (ERCs) and related materials; 2) cultural resources; and 3) paleontological resources. October 30, 2001. Docket date November 5, 2001.
- SMUD (Sacramento Municipal Utility District) 2001e. Supplemental Information Regarding the Application for a Determination of Compliance/Authority to Construct. November 28, 2001. Docket date November 28, 2001.
- SMUD (Sacramento Municipal Utility District) 2002e. Data Response, Set 1C. February 4, 2002. Docket date February 5, 2002.
- SMUD (Sacramento Municipal Utility District) 2002f. Data R, Set 2B. Confidential Filing. February 15, 2002. Docket Date February 19, 2002.
- SMUD (Sacramento Municipal Utility District) 2002o. Data Response, Set 3A. April 15, 2002. Docket date April 15, 2002.
- SMUD (Sacramento Municipal Utility District) 2002p. AFC Supplement B. April 15, 2002. Docket date April 15, 2002.
- SMUD (Sacramento Municipal Utility District) 2002q. Proposed Test Plan for Identified Sites. Submitted to the California Energy Commission June 12, 2002.

SMUD (Sacramento Municipal Utility District) 2002r. "Summary of the Archaeological Survey and Presence/Absence Testing for the Cosumnes Power Plant, Sacramento County, California." Also included: Map of Area Surveyed. Map of Additional Potential Sites, identified by Randy Yonemura and the remote sensing report "Hicksville Cemetery and Site SAC-526H, Geophysical Research." Submitted to the California Energy Commission July 16, 2002.

Ione Band of Miwok Indians 2002b. Letter from Glen Villa, Jr., to Kristy Chew, CEC, comments on the Cultural Resources Testing Plan for the Cosumnes Power Plant. June 20, 2002. Docket date June 24, 2002.

Yolo County 2002. Yolo County Code, Article 2. Sec. 8-8.201 and 8-8.202.

Yonemura, Randy. Concerned Native American 2002a. Letter from Randy Yonemura to Dorothy Torres. Included Native American concerns in general and specific concerns with the proposed test plan. Submitted to the Energy Commission June 21, 2002.

HAZARDOUS MATERIALS MANAGEMENT

Alvin J. Greenberg, Ph.D. and Rick Tyler

INTRODUCTION

The purpose of this staff analysis is to determine if the proposed Cosumnes Power Plant (CPP) project complies with applicable laws, ordinances, and regulations (LORS), and has the potential to cause significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Staff's **Worker Safety and Fire Protection** analysis describes the requirements applicable to the protection of workers from such risks. The only hazardous material that would be stored at the Cosumnes Power Plant in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is aqueous ammonia (29 percent ammonia in water). The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more economical anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the more hazardous anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain and emissions are limited by the slow mass transfer from the surface of the spilled material. Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, would be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project also involves the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. This pipeline would be 26 miles in length (involving the construction and operation of two new compressor stations).

The CPP would also require the transportation of aqueous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

LAWS, ORDINANCES, REGULATIONS, STANDARDS, AND POLICIES

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99-499, §301, 100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Accidental Release Prevention Program (Cal-ARP), implemented pursuant to Health and Safety Code, section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This program supersedes the California Risk Management and Prevention Plan.

Section 25503.5 of the California Health and Safety Code requires facilities which store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the Sacramento County Environmental Management Department (EMD). This Business Plan is required to contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency Response Contingency Plan, an Employee Training Plan, and other recordkeeping forms.

Title 8, California Code of Regulations, section 5189, requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RCPP process.

Title 8, California Code of Regulations, section 458 and sections 500 – 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer anhydrous ammonia. These sections generally codify the requirements of several industry codes, including the ASME Pressure Vessel Code,

ANSI K61.1 and the National Boiler and Pressure Vessel Inspection Code. While these codes apply to anhydrous ammonia, they may also be used to design storage facilities for aqueous ammonia. However, it is more likely that the storage facility would be designed to API 620. This code applies to unpressurized vessels operated at atmospheric pressure.

California Health and Safety Code, section 41700, requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”

LOCAL AND REGIONAL

The Uniform Fire Code (UFC 1997) contains provisions regarding the storage and handling of hazardous materials in Articles 4 and 79. The most recent version of the UFC was adopted in 1997.

The Sacramento County Code (SCC) chapters 6.96 and 6.99 contain ordinances regulating hazardous materials in the county. The Sacramento County Environmental Management Department (EMD) is the designated Certified Unified Program Authority (CUPA) and is responsible for administering Hazardous Materials Business Plans, Hazardous Materials Management Plans, Spill Prevention, Control, and Countermeasure Plans and RMPs.

Additionally, the Sacramento Fire Code contains requirements for proper storage and handling of hazardous materials.

SETTING

The proposed CPP site is located on approximately 30 acres of a portion of a 2,480-acre area, owned by the Sacramento Municipal Utility District (SMUD) in southern Sacramento County, about 25 miles southeast of the city of Sacramento. The CPP site is located about 0.5 miles south of the former Rancho Seco Nuclear Power Plant, which is currently being decommissioned. The project site is located about four miles north of the San Joaquin County line and 5 miles west of the Amador County line. Access to the site is via two roads leading from Clay East Road. Site topography gradually slopes downhill from northeast to southwest, with an elevation of about 160 feet above sea level. The locale is sparsely populated and generally agricultural, with incorporated and unincorporated low-density urban and suburban areas. See **Project Description** for more details.

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

- local meteorology;

- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the level of public exposure to such materials and the associated health risks. When wind speeds are low and stable, dispersion is severely reduced and can lead to increased localized public exposure in the event of an accidental release.

Recorded wind speeds and ambient air temperatures are described in the **Air Quality** section of the AFC (SMUD 2001a, Section 8.1). Staff agrees with the applicant's use of F stability (stagnated air, very little mixing), 1.0 meter/second wind speed, and an ambient temperature of 115° F in its modeling analysis of an accidental release of aqueous ammonia. This is an extremely conservative scenario and reflects worst-case atmospheric conditions (SMUD 2002l, Table HM181-2).

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The terrain in the vicinity of the site gradually slopes downhill from northeast to southwest, and is surrounded by hills as low as 200 feet and as high as 500 feet that mark the beginning of the foothills to the Sierra Nevada Range to the east.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. For this analysis, sensitive receptor locations are generally considered hospitals, schools, daycare centers, and other facilities where large numbers of sensitive individuals are likely to be frequently present. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. The locations of sensitive receptors in the project vicinity are shown in Figure 8.6-1 of the AFC. There are no sensitive receptors within a 3-mile radius. However, a school exists along the transportation route approximately 8.5 miles from the project site in Herald.

ENVIRONMENTAL IMPACTS

Staff thoroughly reviewed and assessed the potential for the handling and use of hazardous materials during both construction and operations to impact the surrounding community. All chemicals and natural gas were evaluated.

METHODOLOGY

In order to assess the potential for released hazardous materials to travel off-site, and impact the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some chemicals must be used that are toxic. Therefore, staff conducted its analysis by examining the need for hazardous materials, the choice of chemical to be used and its amount, the manner in which the applicant will use the chemical, the manner it would be transported to the facility and transferred to facility storage tanks, and the way the applicant chooses to store the material on-site. Staff reviewed the applicant's proposed engineering controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems (such as storage tanks or automatic shut-off valves) which can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that would help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to people.

Staff conducted a thorough review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant (SMUD 2001a, Section 8.12). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts proposed for use as listed in Table 8.12-3 of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff then analyzed the theoretical impacts on the public worst-case spill of hazardous materials even with the mitigation measures proposed by the applicant. If the mitigation methods proposed by the applicant were found to be sufficient, no further mitigation would be required. If the proposed mitigation proposed by the applicant were found to be insufficient to reduce the potential for adverse impacts to an insignificant level, staff would then propose additional prevention and response controls until the potential for causing harm to the public was reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

PROJECT IMPACTS

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form, in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials were eliminated from further consideration.

In addressing the potential for impacts during the construction phase of the project, the only hazardous materials proposed for use include gasoline, fuel oil, hydraulic fluid, lubricants, solvents, cleaners, sealants, welding flux, paint, and paint thinner. Any impact of spills or other releases of these materials would be limited to the site due to the small quantities involved and thus no further analysis of construction phase activities appears warranted.

Continuing with the assessment for the operational phase, after removing from consideration those chemicals that fit into Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: hydrochloric acid, sodium hypochlorite, natural gas, sodium hydroxide, and aqueous ammonia.

Zero Liquid Discharge System

The applicant has proposed a Zero Liquid Discharge (ZLD) system that would process all wastewater and reduce the use of fresh water by the plant. The applicant indicated that the operation of the ZLD system would require the use of six new chemicals and the increase in use of three others, but did not indicate the identity of these chemicals (SMUD 2002aa). Staff is unable at this time to prepare an assessment without this information.

Large Quantity Hazardous Materials

Hydrochloric acid

Hydrochloric acid, which is used in large quantities once every four years for the cleaning of the Heat Recovery Steam Generators (HRSG), does not pose a significant risk of off-site impacts because of the infrequent use and the safety measures taken by the HRSG cleaning company, including the use of temporary berms.

Sodium Hypochlorite

According to the Table 8.12-3 (SMUD 2001a), 16,800 gallons of sodium hypochlorite would be stored at the site. Sodium hypochlorite has a low potential to affect the off-site public because its vapor pressure is low and it is in an aqueous solution. In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form under pressure. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative chlorine gas. The amount of sodium hypochlorite that would be stored on the site is below the Reportable Quantity

as defined in the Cal-ARP regulations. Based upon staff's knowledge about the use of this material and the modeling of accidental releases, an aqueous solution of sodium hypochlorite poses an insignificant risk to the off-site public. However, the chances for accidental spills during transfer from delivery vehicles to the storage tanks should still be reduced as much as possible. Thus, measures to prevent transfer spills are extremely important and would be required as a standard condition in a Safety Management Plan for delivery of sodium hypochlorite (see Condition of Certification HAZ-3).

Sodium Hydroxide

Sodium hydroxide would be stored on site but would not pose a risk of off-site impacts because it has relatively low vapor pressure and thus spills would be confined to the site. Therefore, no further analysis is needed.

Natural Gas

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane, and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas. While natural gas would be used in significant quantities, it would not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices.

In particular, gas explosions can occur in the HRSG and during start-up. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures would significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error.

Since the proposed facility would require the installation of a new gas pipeline off-site, impacts from this pipeline need to be evaluated.

The design of the natural gas pipeline is governed by laws and regulations discussed here. These LORS require use of high quality arc welding techniques by certified welders and inspection of welds. Many failures of older natural gas lines have been associated with poor quality gas welds. Many failures in older pipelines have also resulted from corrosion. Current codes address this failure mode by requiring use of corrosion resistant coatings and cathodic corrosion protection. Another major cause of pipeline failure is damage resulting from excavation activities near pipelines. Current

codes address this mode of failure by requiring clear marking of the pipeline route. An additional mode of failure particularly relevant to the project area is damage caused by earthquake. Existing codes also address seismic hazard in design criteria (see discussion below). Evaluation of pipeline performance in recent earthquakes indicates that pipelines designed to modern codes perform well in seismic events while older lines frequently fail. Staff believes that existing regulatory requirements are sufficient to reduce the risk of accidental release from the pipeline to insignificant levels.

Failures of gas pipelines, according to data from the U.S. Department of Transportation (the National Transportation Safety Board) from the period 1984-1991, occur as a result of pipeline corrosion, pipeline construction or materials defects, rupture by heavy equipment excavating in the area such as bulldozers and backhoes, weather effects, and earthquakes. Given the gas line failures which occurred in the Marina District of San Francisco during the 1989 Loma Prieta earthquake, the January 1994 Northridge earthquake in Southern California, and the January 1995 gas pipeline failures in Kobe, Japan, as well as the January 19, 1995 gas explosion in San Francisco, the safety of the gas pipeline is of paramount importance. However, it must be noted that those pipelines, which failed, were older and not manufactured nor installed to modern code requirements. The February 2001 Nisqually Earthquake near Olympia Washington caused no damage to natural gas mains and there was only one reported gas line leak due to a separation of a service line going into a mobile home park.

In the United States, extensive federal and state pipeline codes and safety enforcement minimize the risk of severe accidents related to natural gas pipelines. In November 2000, the DOT Office of Pipeline Safety proposed a program requiring the preparation of risk management plans for gas pipelines throughout the United States. These risk management plans are proposed to include the use of diagnostic techniques to detect internal and external corrosion or cracks in pipelines and to perform preventive maintenance. The project owner would be required to develop and implement these plans if the proposal is promulgated as a regulation.

The natural gas pipeline proposed for the CPP facility would be installed, owned, and operated by SMUD. If loss of containment occurs as a result of pipe, valve, or other mechanical failure or external forces, significant quantities of compressed natural gas could be released rapidly. Such a release can result in a significant fire and/or explosion hazard, which could cause loss of life and/or significant property damage in the vicinity of the pipeline route. However, the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to DOT statistics, the frequency of reportable incidents is about 0.25 for all pipeline incidents per 1,000 miles per year or 2.5×10^{-4} incidents per mile per year. DOT has also evaluated and categorized the major causes of pipeline failure. To summarize, the four major causes of accidental releases from natural gas pipelines are: Outside Forces-43 percent, Corrosion-18 percent, Construction/ Material Defects-13 percent, and Other-26 percent. Outside forces are the primary causes of incidents. Damage from outside forces includes damage caused by use of heavy mechanical equipment near pipelines (e.g., bulldozers and backhoes used in excavation activities), weather effects, vandalism, and earthquake-caused rupture as seen in the Marina

District of San Francisco during the 1989 Loma Prieta Quake and in Kobe, Japan in January 1995. The fourth category, "Other" includes equipment component failure, compressor station failures, operator errors, and sabotage. The average annual service incident frequency for natural gas transmission systems varies with age, the diameter of the pipeline, and the amount of corrosion.

Older pipelines have a significantly higher frequency of incidents. This results from the lack of corrosion protection and use of less corrosion resistant materials compared to modern pipelines, limited use of modern inspection techniques, and higher frequency of incidents involving outside forces. The increased incident rate due to outside forces is the result of the use of a larger number of smaller diameter pipelines in older systems, which are generally more easily damaged and the uncertainty regarding the locations of older pipelines.

Staff believes the worst-case scenario for off-site natural gas hazard is a large rupture of the pipeline caused by improper use of heavy equipment near the pipeline. The applicant would provide an analysis of the likelihood (which is thought to be very low) of explosion and fire resulting from sparks generated from heavy equipment rupture of the pipeline if the DOT proposal for a pipeline risk management plan becomes regulation. This worst-case scenario would not result in significant asphyxiation hazard since natural gas disperses to the atmosphere rapidly when released. The worst-case scenario is primarily a safety hazard to construction workers. The project owner would mark the pipeline in conformance with State and Federal regulations to lower the probability of the above scenario.

The following safety features would be incorporated into the design and operation of the natural gas pipeline (as required by current federal and state codes): (1) while the pipeline will be designed, constructed, and tested to carry natural gas at a certain pressure, the working pressure will be less than the design pressure; (2) butt welds will be X-rayed and the pipeline will be tested with water prior to the introduction of natural gas into the line; (3) the pipeline will be surveyed for leakage annually (4) the pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and (5) valves at the meter will be installed to isolate the line if a leak occurs.

Aqueous Ammonia

Aqueous ammonia would be used at the CPP in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in hazardous down-wind concentrations of ammonia gas. One 18,000-gallon tank would be used to store a maximum amount of 15,000 gallons of 29 percent aqueous ammonia solution (SMUD 2001a; Page 8.12-8).

Based on the screening analysis discussed above, aqueous ammonia is one of the hazardous materials that may pose a risk of off-site impacts. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia, which would be used and stored on-site. However, as with aqueous sodium hypochlorite, the use of aqueous ammonia

instead of the much more hazardous anhydrous ammonia (i.e., ammonia that is not diluted with water) poses far less risk.

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four “bench mark” exposure levels of ammonia gas occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 150 ppm (recently changed from the 200 ppm value), which is also the RMP level 1 criterion used by U.S. EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm. (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis.) If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff presumes that the potential release poses a risk of significant impact. However, staff also assesses the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether, the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact.

Data Response 181 (SMUD 2002I) provided the results of modeling for a worst-case accidental release of aqueous ammonia. The analysis assumed winds of 1.0 meter per second and atmospheric stability category F would exist at the time of the accidental release. An air temperature of 115° F was assumed. The ALOHA (Areal Locations of Hazardous Atmospheres) air dispersion model was used to estimate airborne concentrations of ammonia. These analyses were designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The worst-case release is associated with a failure of the ammonia storage tank releasing all of its content into the secondary containment area, and the alternative scenario is a failure of a supply truck loading hose spilling aqueous ammonia onto the truck unloading pad with flow to the capture sump.

The results indicated that concentrations exceeding 75 PPM in the worst-case scenario would be present at 801 feet, which is mostly limited to the project site. The off-site areas impacted by the 75-ppm concentration would be to the north and east of the fenceline and approximately 75 feet to the west (just past the transmission towers). In the alternative scenario the concentration of 75 PPM would be present 318 feet away from the truck unloading pad which would impact off-site only to the north and east. The areas immediately to the north, south, east, and west are open fields. The Rancho Seco Nuclear Plant is located approximately 0.5 miles north and northeast of the CPP site. It is assumed at this time that this area would still be used by workers working on the decommissioning of the plant.

There are no sensitive receptors (schools, hospitals, day care centers, etc.) in a three-mile radius and the 75 ppm level does not extend to the public road to the south of the site.

Staff reviewed the applicant's modeling calculations and found the proposed storage and transfer of aqueous ammonia would not cause a significant impact (with the exception of Rancho Seco workers noted above).

Seismic Issues

A Hazardous materials spill could also occur during an earthquake, which would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves, pumps, and neutralization systems. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. This concern over earthquake safety is heightened by the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan in January 1995.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage - including seam leakage - were older tanks while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards, which should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on **Geologic Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of CCR Title 24 and the 1997 Uniform Building Code for Seismic Zone 3 (SMUD 2001a, page 2-19). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks, staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, sodium hypochlorite, and others would be transported to the facility via tanker truck or shipping trucks. While many types of hazardous materials would be transported to the site, it is staff's belief that transport of aqueous ammonia poses the predominance of risk associated with such transport. If the risks of transporting this hazardous material is insignificant, all other transportation risks would be assumed to be insignificant as well.

Although an accidental release of aqueous ammonia during transportation to an Energy Commission-certified gas power plant has never occurred, it is theoretically possible for aqueous ammonia to be released during a transportation accident. The extent of impact in the event of such a release would depend on the location and on the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent on three factors:

- the skill of the tanker truck driver,
- the type of vehicle used for transport, and on
- accident rates.

Staff routinely focuses on the surface streets within the project area after the delivery vehicle leaves the main highway. Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on main California Highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, the U.S. Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence. (See AFC section 8.10.2. for additional information on regulations governing the transportation of hazardous materials.)

To address the issue of tank truck safety, aqueous ammonia would be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with design capacity of 6,000 gallons. These vehicles are designed to DOT Code MC-307. These are high integrity vehicles designed for hauling of caustic materials such as ammonia. Staff has therefore proposed a Condition of Certification (**HAZ-5**) to ensure that regardless of which vendor supplies the aqueous ammonia, delivery would be made in a tanker, which meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on the following references to determine the approach to preparing a hazardous materials transportation accident risk analysis:

- Rhyne, W.R. 1994. Hazardous Materials Transportation Risk Analysis. Quantitative Approaches for Truck and Train.
Chapter 2: Transportation Quantitative Risk Analysis
Chapter 3: Databases.
- Davies, P.A. and Lees, F.P. 1992. "The Assessment of Major Hazards: The Road Transport Environment for Conveyance of Hazardous Materials in Great Britain." *Journal of Hazardous Materials*, 32: 41-79.
- Harwood, D.W., Viner, J.G., and E.R. Russell. 1990. "Truck Accident Rate Model for Hazardous Materials Routing." *Transportation Research Record*. 1264: 12-23.
- Harwood, D.W., Viner, J.G., and E.R. Russell. 1993. "Procedure for Developing Truck Accident and Release Rates for Hazmat Routing." *Journal of Transportation Engineering*. 119(2): 189-199.
- Vilchez, J.A., Sevilla, S., Montiel, H. and J. Casal. 1995. "Historical Analysis of Accidents in Chemical Plants and in the Transportation of Hazardous Materials." *J. Loss Prev. Process Ind.* 8(2): 87-96.

- Pet-Armacost, J.J., Sepulveda, J. and M. Sakude. 1999. "Monte Carlo Sensitivity Analysis of Unknown Parameters in Hazardous Materials Transportation Risk Assessment." Risk Analysis. 19(6): 1173-1184.
- National Response Center Data Base on chemical spills.
- Chemical Incident Reports Center, U.S. Chemical Safety Board data base.
- National Transportation Safety Board data base.

Staff used this data and that from the Davies and Lee (1992) article, which references the 1990 Harwood study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The maximum usage of aqueous ammonia each year of operation of the proposed Cosumnes Power Plant would require about 104-156 tanker truck deliveries of aqueous ammonia per year (maximum of 2-3 trucks per week; SMUD 2002f). Each delivery truck would travel about 10 miles between State Route (SR) 99 and the facility per delivery along the designated transportation route (Twin Cities Road to Clay East Road). The result is a maximum of 1,560 miles of delivery truck travel in the project area per year. Previous assessments by staff have found that the risk over this distance is negligible.

Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) was approximately 0.1 in one million.

Staff therefore believes the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is not unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

However, staff has some concerns about the route used to gain access to the project site. Twin Cities Road is narrow and has no shoulder. Because there are farming and livestock operations in the area, it is reasonable to expect that slow-moving or wide loads (tractors, hay trucks, etc.) would use this road and thus be encountered when transporting hazardous materials to the power plant. It is staff's opinion that due to the narrowness of this road, it would be impossible for a tanker truck to pass a hay truck going in the opposite direction, at normal speeds, without at least one vehicle (and perhaps both) going slightly off the road. This would present an unacceptable risk of accidental release from the tanker truck. Additionally, the route passes a school in Herald and heavy fog exists during morning hours during certain times of the year (late winter and early spring). In order to mitigate this risk, staff recommends adoption of Condition of Certification (**HAZ-8**); that all hazardous materials trucks and tankers be escorted from SR 99 to the facility by a lead vehicle equipped with fog lights and a

readily visible warning that a “wide load” follows. This would ensure that both approaching vehicles would reduce their speed before passing.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff’s opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Based on this, staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

APPLICANT’S PROPOSED MITIGATION

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Administrative controls include the development and implementation of a Safety Management Plan. Elements of facility controls and the safety management plan are summarized below.

ENGINEERING CONTROLS

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineered safety features proposed by the applicant for use at this facility include:

- construction of curbs, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;
- construction of an underground spill containment vault with a wide 24-inch diameter drain from the aqueous ammonia secondary containment basin;
- a sloped containment pad for the aqueous ammonia tanker truck delivery area that will drain through into the same subsurface covered vault placed beneath the storage tank; and
- process protective systems including continuous tank level monitors, alarms, automatic shut-off valves, and fire protection systems.

ADMINISTRATIVE CONTROLS

Administrative controls also help to prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs and by complying with all applicable health and safety laws, ordinances and standards.

The worker health and safety program proposed by the applicant for use at this facility would include (but is not limited to) the following elements:

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- the proper use of personal protective equipment;
- safety operating procedures for operation and maintenance of systems utilizing hazardous materials; and
- fire safety and prevention; and emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner would designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety professional oversees the health and safety program and has the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community or in the event that the health and safety program is violated.

The facility's Safety Management Program would include regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals. SMUD would also prepare a Hazardous Materials Business Plan and a Risk Management Plan (RMP).

In order to address the issue of spill response, SMUD would prepare and implement an Emergency Response Plan which includes information on: hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established which include evacuation; spill cleanup, hazard prevention, and emergency response.

CUMULATIVE IMPACTS

Staff reviewed the potential for the operation of the CPP combined with any existing or planned industrial facilities to result in cumulative impacts on the population within the area. Projects that could potentially contribute to cumulative impacts are those located or which will be located in the same geographic area of influence defined as within a 1-mile radius of the proposed power plant. Staff found no other facilities within a 1-mile radius of the CPP, with the exception of the Rancho Seco Nuclear Power Plant, which is no longer in operation and thus no longer using hazardous materials. Staff finds that the CPP facility, as proposed by SMUD and with the additional mitigation measures proposed by the Staff, poses a minimal risk of accidental release that could result in off-site impacts. It is further extremely unlikely that an accidental release that has very low probability of occurrence (about one in a million per year) would independently occur simultaneously at the CPP and another facility at the same time.

STAFF'S PROPOSED MITIGATION

Staff proposes eight Conditions of Certification mentioned throughout the text (above) and listed below. **HAZ-1** ensures that no hazardous material would be used at the facility except those listed in the AFC unless there is prior approval by the County and

the Energy Commission CPM. **HAZ-2** requires that a RMP be prepared and submitted prior to the delivery of aqueous ammonia. The worst-case accidental release scenario evaluated in the AFC assumed that accidental spills of aqueous ammonia would occur from the storage tank into the catchment system. Staff believes that the most likely event resulting in a spill would be during transfer from the delivery tanker to the storage tank. Staff therefore proposes a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of aqueous ammonia (as well as aqueous hypochlorite solution). The development of a Safety Management Plan addressing delivery of ammonia would further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required Risk Management Plan (RMP). **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications, **HAZ-5** and **-8** address the transportation of aqueous ammonia, and **HAZ-6** and **-7** address the safety of the gas pipeline.

FACILITY CLOSURE

The requirements for the handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, SMUD is responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that SMUD abandons the facility in a manner, which poses a risk to surrounding populations, staff would coordinate with the California Office of Emergency Services, Herald Fire District, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state, or local agencies until the cost can be recovered from the responsible parties.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

PUBLIC COMMENTS

Joe Rominger and Sheri Tall, residents of Yolo County, asked if there would be any health risks to residents living close to the 4,000+ horsepower compressor station proposed to be build by SMUD at their tap line into the PG&E natural gas line located on County Road 29 in Yolo County.

Response: The compressor that is proposed to be built in Yolo County would be electric-driven, and therefore, the operation of this compressor would not require any hazardous chemicals, fuels, or result in the emission of pollutants (see the **Air Quality** and **Public Health** sections of the staff assessment which address release of pollutants into the air). Natural gas pipelines do, however, present a very small risk of fire or explosion. Current laws and regulations required all natural gas pipelines to be built and maintained to the strictest of standards. Please refer to the extensive discussion of laws and engineering control in previous sections of this staff assessment. Therefore, it is staff's opinion that the construction and operation of the proposed compressor poses an insignificant risk to public.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed Cosumnes Power Plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment). However, as indicated in **Socioeconomics Figure 1**, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information that shows the low-income population is less than fifty percent within the same radius. However, based on the hazardous materials analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no hazardous materials environmental justice issues related to this project.

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use would pose little potential for significant impacts on the public. With adoption of the proposed Conditions of Certification, the proposed project would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by U.S. EPA, Sacramento County Environmental Management Department, and Energy Commission staff. In addition, staff's proposed conditions of certification require Sacramento County Environmental Management Department's review, and staff review and approval of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

Staff recommends the Energy Commission impose the proposed Conditions of Certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material not listed in Appendix B (AFC Table 8.12-3), below, or in greater quantities than those identified by chemical name in Appendix B, below, unless approved in advance by - Sacramento County Environmental Management Department and the CPM.

Verification: The project owner shall provide to the Compliance Project Manager (CPM), in the Annual Compliance Report, a list of hazardous materials contained at the facility in reportable quantities.

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) to the Certified Unified Program Authority - CUPA (Sacramento County Environmental Management Department) and the CPM for review at the time the RMP is first submitted to the U.S. Environmental

Protection Agency (EPA). The project owner shall reflect all recommendations of the Sacramento County Environmental Management Department and the CPM in the final documents. Copies of the final Business Plan and RMP, reflecting all comments, shall be provided to the CPM.

Verification: At least 60 days prior to receiving any hazardous material on the site, the project owner shall provide a copy of a final Business Plan to the CPM. At least 60 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final EPA-approved RMP, to the Sacramento County Environmental Management Department and the CPM.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and sodium hypochlorite and shall submit this plan to the CPM for approval. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of aqueous ammonia with incompatible hazardous materials.

Verification: At least 60 days prior to the delivery of aqueous ammonia or sodium hypochlorite to the facility, the project owner shall provide the plan to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125% of the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least 60 days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only transport vehicles that meet or exceed the specifications of DOT Code MC-307.

Verification: At least 60 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall require that the gas pipeline undergo a complete design review and detailed inspection 30 years after initial startup and every 5 years thereafter.

Verification: At least 30 days prior to the initial flow of gas in the pipeline, the project owner shall provide an outline of the plan to accomplish a full and comprehensive pipeline design review to the CPM for review and approval. The full and complete plan shall be amended, as appropriate, and submitted to the CPM for review and approval, not later than one year before the plan is implemented by the project owner.

HAZ-7 After any significant seismic event in the area where surface rupture occurs within one mile of the pipeline, the gas pipeline shall be inspected by the project owner.

Verification: At least 30 days prior to the initial flow of gas in the pipeline, the project owner shall provide a detailed plan to accomplish a full and comprehensive pipeline inspection in the event of an earthquake to the CMP for review and approval. This plan shall be amended, as appropriate, and submitted to the CPM for review and approval, at least every five years.

HAZ-8 All hazardous materials trucks and tankers shall be escorted from State Route 99 to the facility by a lead vehicle equipped with fog lights and a readily visible warning that a "wide load" follows.

Verification: At least 30 days prior to the initial delivery of any hazardous material as listed in AFC Table 8.12-3, the project owner shall certify by letter to the CPM that the required hazardous material transportation escort will be implemented.

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APPENDIX A

HAZARDOUS MATERIAL MANAGEMENT

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 ppm to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by U.S. EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

HAZARDOUS MATERIAL MANAGEMENT

APPENDIX A TABLE 1

Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH ²	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10 ¹	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL ²	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL ³	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL ⁴	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA ²	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2 ⁵	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

References for Appendix A, Table 1

AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

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NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

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Abbreviations for Appendix A, Table 1

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

Appendix B
[Attach AFC Table 8.12-3]

LAND USE

James Adams

INTRODUCTION

The land use analysis of the Cosumnes Power Plant (CPP) focuses on the project's consistency with local land use plans, ordinances, and policies; and the project's compatibility with existing and planned land uses. In general, an electric generation project and its related facilities could be incompatible with existing and planned land uses if it creates unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or if it unduly restricts or precludes existing or planned future uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The proposed power plant site is located in the County of Sacramento. It consists of a natural gas fired power plant, water line, transmission line, natural gas pipeline, compressor stations, valve stations, and inter-tie station. The Sacramento General Plan and the East Franklin Specific Plan are the land use documents relevant to the proposed project. In addition, phase two of the project involves the construction of a natural gas compressor station in unincorporated land in Yolo County. Therefore, the Yolo County General Plan is also pertinent. The Energy Commission determines if a proposed project conforms with all applicable laws, ordinances, regulations, and standards (LORS). As will be discussed in the Compliance with LORS subsection below, State and local agencies are encouraged to provide input in the licensing process pursuant to the relevant LORS.

FEDERAL

There are no federal LORS applicable to the project.

STATE

Subdivision Map Act (Pub. Resources Code § 66410-66499.58)

The Subdivision Map Act provides procedures and requirements regulating land divisions (subdivisions) and the determination of parcel legality. Pursuant to the Act, regulation and control of the design and improvement of subdivisions has been vested in the legislative bodies of local agencies. Each local agency, by ordinance, regulates and controls the initial design and improvement of common interest developments and subdivisions for which the Map Act requires a tentative and final map.

State Planning and Zoning Law (Gov. Code § 65000-66037)

Under State planning law (Section 65300), each incorporated city and county must adopt a comprehensive, long-term general plan that governs the physical development of all lands under its jurisdiction. The general plan is a broadly scoped planning document and defines large-scale planned development patterns over a relatively long timeframe. The general plan consists of a statement of development policies and must include a diagram and text setting forth the objectives, principles, standards and proposals of the document. At a minimum, a general plan has seven mandatory

elements including Land Use, Circulation, Housing, Conservation, Open Space, Noise, and Safety.

CALIFORNIA GOVERNMENT CODE (Gov. Code § 53091)

Section 53091 of the Government Code specifically exempts local agency (e.g., SMUD) projects involving the production of energy from city or county zoning code and building permit requirements, but does not exempt them from General Plan policies, nor does it exempt transmission lines. Therefore, staff will analyze the CPP to determine its compatibility with the Sacramento County, Yolo County, and the City of Elk Grove's general plans. The CPP is not bound by any Sacramento County zoning code or building permit requirement. Similarly, the construction of the natural gas pipeline or related facilities are not bound by any zoning code or permit requirement from Sacramento or Yolo counties or the City of Elk Grove.

LOCAL

Sacramento County General Plan

The Sacramento County General Plan (GP) was adopted on December 15, 1993. Elements of the General Plan most relevant to the proposed project include Land Use, Agricultural, and Public Facilities. These elements provide guidelines and policies that pertain to industrial developments such as the CPP (County of Sacramento 1993). The General Plan Land Use Diagram shows that the CPP site is designated Public/ Quasi-Public, with a Resource Conservation overlay. The designation is consistent with the existing Rancho Seco Plant facility, which is a Public/Quasi-Public use, and is located in an agricultural area. Staff considers the General Plan the primary document for determining the CPP's consistency with local LORS, as long it is compatible with the local zoning ordinance.

Land Use Element

General Plan Land Use (LU) Policies numbers 22 through 25 provide guidelines related to structures and lighting to minimize adverse visual affects to nearby neighbors (see the **Visual Resources** section of this document for more information). Land Use Policy (LU-70) directs the County to work with public service providers, including electric and other service providers in developing financial and service planning strategies consistent with the General Plan policies. The LU-74 policy entitled "Zoning Consistency Matrix" shows that an electrical generating power plant is compatible with some Public/Quasi-Public uses. This use designation seems reasonable since the Rancho Seco facility has been in the area for many years. Staff has not seen any formal documentation that states that a power plant is consistent with an agricultural land use designation. However, Sacramento County staff's letter of November 9, 2001 states that with two exceptions, Public Facilities Policy 118 (see below) and Noise Policy two (see **Noise and Vibration** section), the CPP is consistent with policies in the General Plan (County of Sacramento 2001b).

Agricultural Element

The purpose of this element is to maintain agricultural land and its productivity. The County recognizes the importance of agriculture not only for food production, but for open space considerations as well. Specifically, Policy AG-1 requires the County to

protect prime farmland and lands with intensive agricultural investments from urban encroachment policy.

Public Facilities Element

The most relevant portion of this element is the Energy Facilities section that offers suggestions to minimize environmental impacts caused by the construction and operation of energy facilities.

- Public Facilities (PF) -70 states that the Board of Supervisors and Policy Planning Commission should not approve development projects for energy facilities if they violate any policies in the Public Facilities section unless they are justified through findings.
- PF-72 encourages energy production and distribution facilities to be located and designed in a manner that is compatible with surrounding land uses.
- PF-85 through 89, 92, 93, 99, and 100 describe siting priorities and design features for transmission lines. The goal is to utilize existing transmission line corridors whenever possible, avoid existing and planned urban areas, minimize visual impacts, preserve existing land uses, and avoid biological and cultural resources.
- PF-112 and 113 relate to the location of electrical distribution substations and efforts to minimize visual impacts in residential areas.
- PF-118 requires that new high-pressure gas lines be routed within railway and electric and transmission corridors, along collector roads, and within existing easements.
- PF-120 states that all Community Plans shall include an Energy Facility Siting Element.

Conservation

A number of Conservation Policies (CO) are relevant to the CPP, but with one exception. CO-13 requires roads and structures to be designed, built and landscaped to minimize erosion during and after construction. This policy is discussed in the **Biological Resources** section of this PSA.

The Sacramento County staff correspondence of November 9, 2001 contained a table that included other General Plan Elements such as Noise, Open Space, and Scenic Highways. The Noise element is discussed in the **Noise and Vibration** section of this analysis. Since there are no consistency issues with Open Space and Scenic Highways, staff does not believe these are not relevant to the land use analysis of the CPP.

Sacramento County Zoning Code

The CPP site is zoned AG-80, which allows single family dwellings at a density no greater than one unit per 80 acres. There are development standards within the County Zoning Code that would be applicable to the CPP although they are exempted by Energy Commission regulations and California Government Code Section 53091. The standards are found in Sections 320-1 to 320-8, and 301-21. They pertain to setback,

landscaping, fencing and height and are primarily applicable to residential structures (County of Sacramento 2001a). Sacramento County and Energy Commission staff will review the proposed setback and fencing for the CPP in the context of it being an allowed Public-Quasi Public use in an agricultural area.

With respect to landscaping, a portion of one requirement within the County Zoning Code Section 320-05 is applicable. A planter or landscaped area at least twenty-five (25) feet wide should be provided adjacent to all public rights-of-way, excluding approved driveway entrances. There are no requirements for solid fencing applicable to the CPP.

Section 320-4 requires a 40-foot height limit for buildings and structures. Section 301-21 excepts towers and water tanks from this restriction as long as the combined square footage of the base of the structure is less than 1,600 square feet.

Yolo County General Plan

The second phase of the CPP would require installing two gas compressor stations, one of which would be in agricultural lands in rural Yolo County five miles north of the City of Winters. The land is designated for agricultural uses directly related to the production of crops. The relevant goals from the Yolo County General Plan for the proposed project are: 1) to protect prime and other agricultural land from urban development, encourage conservation (energy, open space, and materials); 2) to ensure that efficient utility service is provided, and 3) to assure that the costs of new projects are borne by the beneficiaries of such development. More specifically, Land Use Policy 35 mitigates and avoids adverse impacts by managing industrial and commercial locations and development configurations (County of Yolo 1983).

Yolo County Zoning Ordinance

The compressor station site is zoned AG1, which provides land in rural areas for uses directly related to agricultural industry. Section 8-2.612 describes the principal uses for AG1 land. In general, any requested change in an authorized use shall require a Minor Use Permit. One of the listed uses pertains to electrical distribution substations, transmission substations, communication equipment buildings, and public utility service yards (County of Yolo 2000).

City of Elk Grove

The CPP natural gas pipeline would cross the southwest portion of the City of Elk Grove's East Franklin area. The East Franklin Specific Plan guides the land use within this portion of Elk Grove (City of Elk Grove 2002a). The Plan applies to an area of approximately 2,470 acres located about two miles west of the center of the City of Elk Grove. Its purpose is to provide direct and comprehensive correlation between land use, public facilities, and services necessary for support of land use. Among other things, the Plan acknowledges the presence of natural gas and petroleum pipelines within the Union Pacific Railroad right-of-way located west of Franklin Boulevard and south of Elk Grove Boulevard (City of Elk Grove, 2000). The dominant land use is and will remain residential development. The relevant policy within the Land Use Element of the Plan is Land Use-18 that requires new development to be compatible with surrounding development (County of Sacramento 2000).

SETTING

POWER PLANT SITE AND VICINITY

Existing Land Use

The proposed power plant site is located in southeastern Sacramento County, approximately 25 miles southeast of the City of Sacramento. The site is about one-half mile south of the Rancho Seco Nuclear Power Plant (SMUD 2001a, pg. 8.4-4). This facility is currently being decommissioned and has not operated for many years. The CPP would be built on a 30-acre site located within a 2480-acre site owned by SMUD. The project is bordered by Clay East Road to the south, and is approximately 1.75 miles east of the junction of Clay East Road and Twin Cities Road. It is located about four miles north of the San Joaquin County line and five miles west of Amador County. The land use in this general area is predominantly agricultural with incorporated and unincorporated urban/suburban areas. The site is currently grazed by cattle for weed control purposes.

Existing land uses within a one-mile radius of the site include the Rancho Seco nuclear power plant to the north, four solar photovoltaic electricity facilities to the northeast, agricultural areas (i.e., vineyards and grazing lands) to the south and west. The Rancho Seco Reservoir and recreation area is about two miles to the east. The recreation area is used for camping, picnicking, fishing, swimming, wind surfing and miscellaneous small boat activities. Existing land uses within one mile of the power plant site and 0.25 mile of the proposed natural gas line are shown on **Land Use Figures 1A - 1E**. The nearest residence is approximately 800 feet southwest of the proposed site, and there are a few other residences/ranches within one mile. A grape vineyard is about 1,200 feet to the west.

Historically, much of the flat portions of the southeast portion of Sacramento County have been used for agriculture (SMUD 2001a, pg.8.4-4). The CPP site, related transmission line, and access road are located in areas that do not involve irrigated agricultural lands. The majority of the 26-mile long natural gas line would be constructed in existing public right-of-way (road and utility easement), or just outside railroad right-of way. However, a portion of the gas line would cross lands used for agricultural and natural preservation purposes.

Planned Land Use

The Rancho Seco Nuclear Power Plant is currently being decommissioned. Part of the decommissioning involves the construction and operation of an Independent Spent Fuel Storage Installation within the Rancho Seco plant site. This process involves removing the spent fuel rods from the nuclear reactor and storing them in large steel canisters which will eventually be sent to a nuclear waste facility in accordance with U.S. Department of Energy and Nuclear Regulatory Commission guidelines. This project will be taking place over the next several years (SMUD 2001a, pg. 8.4-7).

The only other planned development in the proposed power plant vicinity is an expansion of SMUD's photovoltaic facility. Staff has not seen a description or timeline

for this expansion. SMUD does periodically review proposals for commercial uses of its property, although there are none at this time. Presumably, any future development will be consistent with the General Agriculture and Public/Quasi-Public General Plan designation (SMUD 2001b). There are ongoing and anticipated developments along the natural gas pipeline route but these are relatively minor projects, or they will be completed by the start of construction of the pipeline (County of Sacramento 2002a, City of Elk Grove 2002b). Given the agricultural nature of the proposed power plant area, no urban growth is anticipated.

LINEAR FACILITIES

Electrical Transmission Line

Electrical transmission features of the CPP consists of a new 230 kV switchyard onsite and two 0.4 mile-long 230 kV transmission lines to the Rancho Seco substation. The lines would be mounted on dual line monopole tower structures approximately 100 to 125 feet tall. The transmission corridor would be wide enough to allow two sets of poles from the CPP to the Rancho Seco substation (SMUD 2002p, pg. 1-3). The transmission lines, switchyard, and relay and control building would be built on property owned by SMUD (SMUD 2001, pgs. 5-7 & 8).

Natural Gas Pipeline Route

The proposed 26-mile long natural gas pipeline would connect with SMUD's gas line at the Carson Ice-Cogeneration facility to the northwest of the power plant site. As noted earlier, the pipeline route would head south and east to the CPP through railroad and utility rights-of-way. If possible, SMUD would acquire additional right-of-way to avoid sharing right-of-way with other utilities. The 24-inch diameter gas pipeline would be buried in a trench approximately three to seven feet wide and at least five feet deep (SMUD 2001, pg. 6-4). Land uses along the route are primarily agricultural with the exception of the northern portion near the Cogeneration plant, which is a combination of residential and commercial uses. These uses are expected to remain the same for the foreseeable future. The City of Elk Grove and Sacramento County are planning upgrades to the water and sewer lines in the East Franklin area.

Water Supply Pipeline And Waste Discharge

The proposed 0.4-mile water supply pipeline would connect to an existing 66-inch underground water main that services Rancho Seco and originates from the Folsom-South Canal (SMUD 2001, pg. 1-4). Potable water would be filtered and stored in a bulk storage tank with a capacity of 2,500 gallons (SMUD 2001, pg. 2-10). Wastewater discharge would be processed in a packaged sanitary waste treatment system. Cooling tower process water would ultimately be sent to a zero-liquid discharge system (2003ac, pg. ii).

Power Plant Site Access Road

SMUD is proposing to develop an access road along the eastern boundary of the CPP. This paved road would be 24 feet wide and could withstand heavy loads.

NATURAL GAS COMPRESSOR STATIONS

As noted above, the second phase of the project would require the installation of two natural gas compressor stations. One would be located at PG&E's 400/401 inter-tie north of County Road 29, approximately five miles north of the City of Winters in Yolo County (see **Land Use Figure 2**). The other would be located at SMUD's Valve Station #190, just north of the Carson Ice-Cogeneration facility and west of Franklin Boulevard (see **Project Description Figure 6**).

IMPACTS

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if the project will:

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- Physically divide an established community; or
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use.
- Generation of substantial growth or displacement of a large number of people.
- Conflict with established recreational, educational, religious or scientific uses in the area.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Conflict with existing zoning for agricultural uses.
- Disruption or nuisance, such as noise or dust that would cause adverse effects to the development of future land uses.
- Disruption of traffic that would restrict access and adversely affect land uses, or disruption of visual resources, affecting other land uses such as recreation.

To determine direct and cumulative impacts, staff has reviewed the CPP AFC, data responses, applicable land use plans, and correspondence with Sacramento County, the City of Elk Grove, and Yolo County planning staff.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Public Resources Code section 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the commission determines that such facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity." When determining if a project is in conformance with state, local, or regional ordinances or regulations, the Energy Commission typically meets and consults

with the applicable agencies to determine conformity and, when necessary, “to attempt to correct or eliminate any noncompliance” (Pub. Resources Code, § 25523(d)(1)). The laws, ordinances, regulations, standards (LORS), and policies applicable to the project have been analyzed below to determine the extent to which the project is with each requirement or standard. The LORS analysis is also the first item in the CEQA checklist in bullet form above.

State

Subdivision Map Act

Page 8.4-5 of the AFC, section 8.4.2.2.1 states that the proposed project is to be located on two parcels identified as Assessor's Parcel Numbers 140-0050-010, and – 008, totaling 30 acres. In addition, a third parcel (140-0050-013) located south of Clay East Road would be used for parking and laydown. The vesting deed for the Rancho Seco area shows that the land was conveyed to SMUD (a public utility) in 1966 with a fee interest payment. Pursuant to Section 66426.5 of the Subdivision Map Act, the applicant was not required to file a parcel map. Therefore, staff finds the proposed project is consistent with the Subdivision Map Act.

The CPP is consistent with the State planning law and is discussed in more detail in the Local LORS discussion below. The proposed project is also consistent with California Government Code Section §53091 because the CPP is not bound by any city or county zoning code. The only exception is for transmission lines which is discussed in more detail in the **Transmission System Engineering** section of this PSA.

Local

Sacramento and Yolo County General Plans

As noted in the LORS discussion above, the Sacramento County General Plan is the primary document for determining the CPP's consistency with local LORS. In particular, the Land Use, Agricultural, Public Facilities, and Conservation elements within the Plan are the most relevant. Staff believes that the proposed project is consistent with these elements which is also noted in the Sacramento County staff correspondence (County of Sacramento 2001b). The CPP is also consistent with the Yolo County General Plan. A more detailed discussion is addressed in the compatibility with existing and planned land uses section below.

Sacramento and Yolo County Zoning Codes

The CPP is consistent with the Sacramento County AG-80 zoning designation in the project area. The applicable standards within Sacramento County Zoning Code are found in Sections 320-1 to 320-8, and 301-21 and pertain to setback, landscaping, fencing, and height. Sacramento County and the Energy Commission will review the proposed plans to generally comply to these sections even though they are not mandatory. Similarly, Section 8-2.612 of the Yolo County Zoning Code contains a permitted use for land zoned AG1, which applies to the natural gas compressor station site north of the City of Winters. Compatible uses include distribution substations, public utility service yards, and related facilities. Staff believes the CPP is consistent with the Sacramento and Yolo County Zoning Codes.

City of Elk Grove

The CPP natural gas line would cross the southwest portion of the East Franklin area. Within the Plan, policy Land Use-18 requires new development to be compatible with surrounding development. Since there are natural gas and other utility lines adjacent to the project's proposed gas line, staff believes the CPP is compatible with the East Franklin Specific Plan.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

Power Plant

Construction laydown and parking areas for the power plant would be located within the 30-acre project site and a 20-acre area located south of Clay East Road (2001a, Figure 2.2-3). The 20-acre laydown area would temporarily displace some grazing land, however SMUD proposes to restore the 20-acre area after construction is complete. The temporary impact of removing grazing land is not considered a significant impact. In addition, the permanent loss of 30 acres of grazing land for the project is a minor impact given the large amount of agricultural land in the area.

The CPP is compatible with the surrounding agricultural uses, and the small number of rural residences in the vicinity in that it would not disrupt existing operations. It is merely an expansion of the long established energy facility use in the area. It is also compatible with recreational uses at the Rancho Seco Park and would not disrupt or preclude any activities.

Temporary construction impacts, such as increased dust, noise, and traffic may affect nearby land uses (please see appropriate sections of the PSA).

As noted earlier, the 30-acre power plant site is currently grazed for weed control purposes. The area within a one-mile radius of the site is similar to the proposed site except for the vineyards approximately one-quarter mile to the west. Thus, the power plant would not disrupt or divide the physical arrangement of an established community.

The power plant site, which is designated Public-Quasi Public with a Resource Conservation overlay by Sacramento County, is within an approximately 2,480-acre area owned by SMUD. A power plant is consistent with the Public-Quasi Public designation of the site. The open area around the proposed plant would provide a buffer between the project site and adjoining properties. The proposed project is compatible with the Land Use, Public Facilities, and Agricultural Elements of the Sacramento County General plan. Given the proximity of Rancho Seco and associated linear facilities, the CPP is consistent with PF-70 of the Public Facilities Element that encourages energy production and distribution facilities to be located and designated in a manner that is compatible with surrounding land uses. As noted in the Sacramento County's staff correspondence of November 9, 2001, the CPP may be inconsistent with Noise policy NO-2 and Conservation policy CO-13. See the **Noise and Vibration** section of this assessment for further information regarding NO-2. CO-13 requires that roads and structures should be built and landscaped to minimize erosion during and after construction. Land Use Condition of Certification **LAND-1** would ensure that this

takes place. The proposed project is consistent with all the other elements identified by Sacramento County staff.

The CPP would consist of, among other things, four heat recovery steam generators that would be 160 feet high. In addition, two water storage tanks would be approximately 42 feet high with a slightly greater than 1,600 square foot base. However, as noted earlier, variances from local zoning codes would not be required since the CPP, an energy production project, is exempt from local zoning codes pursuant to Government Code Section 53091. Staff will obtain any conditions Sacramento County would otherwise impose on a power plant if it were not for the Energy Commission's authority to approve such appurtenant facilities to the project. These conditions will be presented in the FSA.

Gas Pipeline

The CPP natural gas line is consistent with the Sacramento County General Plan and the City of Elk Grove's East Franklin Specific Plan since it would be located within or adjacent to an existing gas line in the Union Pacific railroad right-of-way. The route of the proposed natural gas line would cross land within the Plans' jurisdictions. The proposed project is compatible with surrounding development which is noted in the Land Use Element of the Specific Plan, and a natural gas line is already in place adjacent to portions of the proposed CPP gas line route. There are nine pending or approved projects displayed on **Land Use Figures 1A - 1E**. Three of these are located adjacent to the northern portion of the proposed gas line (see **Figure 1E**). These include two residential developments, and a RV and boat storage facility. The other six projects are a considerable distance away from and should not be affected by the construction of the proposed natural gas line. Staff is recommending that SMUD coordinate with Sacramento County and the City of Elk Grove Planning Departments to avoid a potential disruption of these projects during the construction of the natural gas line (see Condition of Certification **LAND-2**).

The CPP pipeline is also consistent with the Sacramento County Zoning Ordinance and the Elk Grove Zoning Ordinance. The City of Elk Grove has requested that the project owner coordinate with City of Elk Grove and the Sacramento County departments of water resources with respect to the installation and/or upgrade of water and sewer lines that are planned to cross the railroad right-of way (City of Elk Grove 2002c). These are displayed on **Land Use Figures 1D and 1E**. The construction of these lines may overlap with the construction of the gas, sewer and water lines (County of Sacramento 2002c). Condition of Certification **LAND-2** would ensure that this coordination takes place.

Natural Gas Compressor Stations

The second phase of the CPP project would require the installation of two gas compressor stations. One station would be located in Yolo County, approximately 5 miles north of the City of Winters (see **Land Use Figure 2**). The Yolo County Zoning Code requires a Conditional Use Permit, Franchise Agreement, and Encroachment Permit for any requested change in electrical distribution and transmission substations, communication equipment buildings, and public utility service yards. Staff concurs with the determination by Yolo County Planning Commission staff that the gas compressor station falls within this code description (County of Yolo 2002a).

The second gas compressor will be located just north of the Carson Ice-Cogeneration facility in Elk Grove. Staff will obtain any conditions the City of Elk Grove and Yolo County would otherwise impose on a natural gas compressor station if it were not for the Energy Commission's authority to approve such appurtenant facilities to the project. These conditions will be presented in the FSA.

Electrical Transmission Line

The proposed 0.4 mile interconnection route between the power plant switchyard and the existing Rancho Seco 230 kV transmission line traverses the proposed project site. Thus, the interconnection route will not disrupt or divide the physical arrangement of an established community. The area traversed by the interconnection route is planned for energy production uses. A new electrical transmission line segment would be compatible with these uses. There are no right-of-way easements needed for the transmission line (SMUD 2001a, page 8.4-11). Thus, the transmission line route would not preclude or unduly restrict existing or future land uses in the project area.

Natural Gas Pipeline Route

The proposed 26-mile long natural gas pipeline would connect with the end of SMUD's gas line at the Carson Ice-Cogeneration power facility in Elk Grove and would proceed south and east to the CPP. It would be constructed adjacent to and within an existing railroad and transmission rights-of-way, and roadways (Franklin Road, Core Road, Arno Road, Valensin Road, Laguna Road, Twin Cities Road and Clay East Road). The pipeline would also be placed beneath the Cosumnes River within the Cosumnes River Nature Preserve and other sensitive habitats. The **Biological Resources** section of this assessment discusses potential impacts on biological resources and related mitigation. Since it would be underground and placed adjacent to existing easements, the proposed gas supply pipeline would not preclude or unduly restrict existing or future surrounding land uses. Please refer to the **Traffic and Transportation** section for a discussion of temporary impacts to local roadways during construction. The northern portion of the pipeline route would be adjacent to residential areas and is consistent with the East Franklin Specific Plan.

Water Supply Pipeline

Construction of the 0.4 mile water supply pipeline is expected to take 7 to 10 days. Since it would be underground and follow the routes of planned roadways, the water supply pipeline would not preclude or unduly restrict future uses.

Power Plant Site Access Road

SMUD proposes to construct an access road heading south off of Twin Cities Road along the eastern boundary of the project site within SMUD's 2,480 acre property (see **Project Description Figure 7**). The access road would not disrupt or divide the physical arrangement of the local area.

Agricultural Impacts

Development of the CPP would preclude future use of the site for agriculture. The lack of irrigation, the relatively small amount of acreage, and the absence of cultivation leads

staff to conclude that the conversion from grazing land to industrial use is not a significant impact (California Department of Conservation 2002).

CUMULATIVE IMPACTS

The proposed project would add to the industrial character of the existing Rancho Seco power plant site. The CPP would contribute to cumulative loss of agricultural land in Sacramento County but the impact is not significant. The project would be a small component of the overall development of the local area, and would not contribute to the loss of irrigated and cultivated agricultural land. As noted above, the project site has not been farmed for many years. Staff believes that there would be no significant cumulative impacts from the construction and operation of the CPP.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population within a six-mile radius of the proposed CPP is less than 50 percent. However, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information shows the low-income population is less than 50 percent within the same radius. Staff has not identified unmitigated significant direct or cumulative Land Use impacts resulting from the construction or operation of the CPP, and therefore there are no Land Use environmental justice issues related to this project.

FACILITY CLOSURE

At some point in the future, the project would cease operation and close down. At that time, it would be necessary to ensure that closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The information provided in the AFC did not specifically address the effects of project closure on land use issues and concerns. The planned lifetime of the project is 30 years. Compliance staff would require that the project owner prepare a Facility Closure Plan for Energy Commission review and approval at least twelve months prior to the initiation of decommissioning. At the time of closure, all applicable LORS would be identified and the closure plan would discuss conformance of decommissioning activities with these LORS.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would have to comply with in the event of an unexpected temporary closure or an unexpected permanent closure of the project.

MITIGATION

Staff has proposed conditions of certification that would ensure the CPP would comply with minimum design and performance standards set forth in the Sacramento and Yolo counties' zoning ordinances. In addition, the project owner would be required to submit a variety of plans (e.g., grading and erosion permit, erosion and sediment control plan) and relevant information to the Sacramento County Planning Department, the Sacramento County Department of Water Resources, the City of Elk Grove, and the Yolo County Planning Department.

CONCLUSIONS AND RECOMMENDATION

The project would comply with all applicable land use laws, ordinances, regulations and standards. The CPP would be compatible with existing and planned land uses because the project: 1) is compatible with the dual General Agriculture and Public/Quasi Public designations identified for the site in the Sacramento County General Plan; 2) would not physically divide an established community; 3) would not substantially preclude or restrict existing land uses; 4) would not preclude or restrict any planned land uses; and 5) with mitigation, would not cause any significant dust, noise, traffic, or visual impacts. The CPP would not contribute substantially to any cumulative land use impacts.

If the Energy Commission certifies the CPP project, staff recommends that the Energy Commission adopt the following proposed conditions of certification.

CONDITIONS OF CERTIFICATION

LAND-1 SMUD shall comply with the minimum design and performance standards set forth in the Sacramento County, Yolo County, and City of Elk Grove zoning ordinances.

Verification: At least 30 days prior to construction of the CPP project, the project owner shall submit written evidence to the Energy Commission Compliance Project Manager (CPM) that the project conforms to all applicable design and performance standards for the set forth in the Sacramento County Zoning Ordinance. The submittal to the CPM shall include evidence of review by Sacramento County.

LAND-2 The project owner shall create a schedule and plan for the construction of the natural gas and recycled water pipelines. The plan will be used to coordinate construction activities (i.e., water and sewer lines) with any other development within a quarter-mile of the gas pipeline route.

Verification: At least 90 days prior to the construction of the natural gas line, the project owner shall provide to the Director of the Sacramento County Planning Department and the City of Elk Grove Planning Department for review and comment, and the CPM for review and approval the schedule and plan, as specified above, for the project's natural gas pipeline construction.

REFERENCES

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City of Elk Grove 2000. East Franklin Specific Plan. Adopted by the Sacramento Board of supervisors on April 28, 2000.

City of Elk Grove 2002a. Personal communication with Craig Hoffman, Planner for the City of Elk Grove, with James Adams, California Energy Commission, on February 1, 2002.

City of Elk Grove 2002b. Letter from Craig Hoffman to James Adams dated February 12, 2002.

City of Elk Grove 2002c. Letter from Patrick Angell, Planner, City of Elk Grove, to Paul Richins, Jr., California Energy Commission, dated May 6, 2002.

County of Sacramento 1993. County of Sacramento General Plan. Land Use Diagram, Land Use, Agricultural and Public Facilities Elements. Adopted on December 15, 1993. Land Use and Agricultural Elements last revised on May 2, 1997; Public Facilities Element last revised on August 12, 1998.

County of Sacramento 2000. Final Environmental Impact Statement for the East Franklin Specific Plan, Volume 1. Released on February 18, 2000.

County of Sacramento 2001a. E-mail from Robert Burness, Senior Planner, Planning and Community Development Department, to Sandra Fromm (California Energy Commission) on October 11, 2001.

County of Sacramento 2001b. Inter-Department Correspondence from Planning and Community Development Department to Policy Planning Commission, dated November 9, 2001.

County of Sacramento 2002a. Facsimile transmission from Keri Blaskoski, Planner, Department of Economic Development, to James Adams on January 29, 2002.

County of Sacramento 2002b. Facsimile transmission from Rob Burness, Planner, Sacramento County Planning and Community Development Department, to James Adams on February 22, 2002.

County of Sacramento 2002c. Letter delivered via e-mail from Michael Johnson, Assistant Engineer, Drainage Development Review/Hydrology, County of Sacramento, Department of Water Resources, to James Adams, dated June 21, 2002.

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County of Yolo. 2002b. E-mail from Lance Lowe, Planner with Yolo County Planning Commission to Mark Hamblin, California Energy Commission, dated April 3, 2002.

SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001.

SMUD (Sacramento Municipal Utility District) 2002a. Data Responses, Set 1a. Submitted to the California Energy Commission on January 9, 2002.

SMUD (Sacramento Municipal Utility District) 2002e. Data Responses, Set 1c. Submitted to the California Energy Commission on February 4, 2002.

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SMUD (Sacramento Municipal Utility District) 2002d. Data Responses, Set 1D. Submitted to the California Energy Commission on February 15, 2002.

SMUD (Sacramento Municipal Utility District) 2002j. AFC Supplement A. Submitted to the California Energy Commission on March 15, 2002.

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NOISE AND VIBRATION

Jim Buntin

INTRODUCTION

The construction and operation of any power plant creates noise or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Cosumnes Power Plant (CPP), and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated, and would comply with applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time to which the worker is exposed (see **Noise Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of vibration perception is 65 decibels (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

California Government Code Section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **Noise Table 1**. Refer to **Noise Appendix A** for definitions of the terms used in this table and subsequent sections.

Noise Table 1 - Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY		COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)																		
		50			55			60			65			70			75			80
	Residential - Low Density Single Family, Duplex, Mobile Home																			
	Residential - Multi-Family																			
	Transient Lodging – Motel, Hotel																			
	Schools, Libraries, Churches, Hospitals, Nursing Homes																			
	Auditorium, Concert Hall, Amphitheaters																			
	Sports Arena, Outdoor Spectator Sports																			
	Playgrounds, Neighborhood Parks																			
	Golf Courses, Riding Stables, Water Recreation, Cemeteries																			
	Office Buildings, Business Commercial and Professional																			
	Industrial, Manufacturing, Utilities, Agriculture																			

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of a simple tone, or “pure tone,” in terms of one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by 5 dBA.

Other State LORS include the California Environmental Quality Act (CEQA) and the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

California Environmental Quality Act

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

- a) exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- b) exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- c) a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item c) above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA L_{90} or more at the nearest noise sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a rural setting is insignificant; an increase of more than 10 dBA is clearly significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level¹;
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites;
5. public reactions or controversy as demonstrated at workshops or hearings, or by correspondence;
6. prior CEQA determinations by other agencies specific to the project.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

1. The construction activity is temporary,
2. Use of heavy equipment and noisy activities is limited to daytime hours, and
3. All feasible noise abatement measures are implemented for noise-producing equipment.

Cal-OSHA

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (**see Noise Appendix A, Table A4**).

LOCAL

Sacramento County General Plan Noise Element

The Noise Element of the Sacramento County General Plan contains provisions and policies that are intended to minimize noise impacts to the community. The noise level standards for new projects, including non-transportation noise sources, affecting residential land uses are shown by **Noise Table 2**.

Noise Table 2 – Sacramento County Noise Element Standards

Noise Level Descriptor	Daytime Standard, dBA (7 a.m. to 10 p.m.)	Nighttime Standard, dBA (10 p.m. to 7 a.m.)
Median Level (L50)	50	45
Maximum Level	70	65
Source: County of Sacramento, 1993		

Each of the above standards is reduced by 5 dBA when applied to simple tone noise, noise consisting primarily of music or speech, or recurring impulsive noise. These standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

¹ For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with the data supporting the noise guidelines of the World Health Organization. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

Sacramento County Code

Sacramento County has adopted specific noise performance standards for existing stationary sources in Chapter 6.68 of the Sacramento County Code. These standards are five decibels higher than the Noise Element standards shown by **Noise Table 2**.

Construction noise is exempt from the above noise standards between the hours of 6:00 a.m. to 8:00 p.m. on weekdays, from 7:00 a.m. to 8:00 p.m. on Saturdays, and from 8:00 a.m. to 8:00 p.m. on Sundays.

City of Elk Grove General Plan Noise Element

The City of Elk Grove has adopted the Noise Element of the Sacramento General Plan; the noise standards are shown by **Noise Table 2**.

Yolo County General Plan Noise Element

The Noise Element of the Yolo County General Plan contains provisions and policies that are intended to minimize noise impacts to the community. The Noise Element indicates that a noise level of 60 dB DNL or CNEL, or less, is “Clearly Acceptable” for residential land uses. This is equivalent to a steady-state noise level of 54 dBA or less.

The applicant noted that Yolo County, in recent land use decisions, has adopted the following additional policies:

- New development of commercial, industrial or other noise-generating land uses shall not be permitted if resulting noise levels shall exceed 60 dBA in areas where residential or other noise sensitive land uses exist or are planned.
- New development shall mitigate outdoor and indoor noise levels for existing residences that would be exposed to an increase of 5 dBA or more, and would be exposed to a DNL in excess of 60 dB.
- Noise sensitive land uses shall not be allowed where the noise due to non-transportation noise sources will exceed an hourly Leq of 55 dB between 7:00 a.m. and 10:00 p.m., and 50 dB between 10:00 p.m. and 7:00 a.m. These noise levels shall be lowered by 5 dB for simple tone noises or for noises consisting primarily of speech or music.

SETTING

PROJECT BACKGROUND

The CPP project involves the construction and operation of a nominal 1,000-megawatt (MW) combined cycle power plant, which is proposed to be located on a portion of a 2,480-acre area owned by SMUD, south of the Rancho Seco nuclear power plant site in Sacramento County. The project is comprised of two power blocks (Phase 1 and Phase 2), each consisting of two natural gas combustion turbines with heat recovery steam generators, and a condensing steam turbine. Mechanical draft cooling towers would be employed. The CPP would be connected to the existing SMUD transmission system. The CPP would include construction of a natural gas supply line, which would require

installation (in Phase 2) of two gas compressor stations, one near Winters in Yolo County, and one in Elk Grove near existing Valve Station 190. Valve stations would also be installed.

The equipment that has the greatest potential to generate significant noise levels includes the gas and steam turbines, steam generators, the auxiliary boiler, pumps, motors, main transformers, the mechanical draft evaporative cooling towers, and the gas compressors.

Power Plant Site

This site is located within Sacramento County. Land uses in the project vicinity include agricultural, industrial, and residential uses.

The CPP would be constructed on currently vacant land south of the existing Rancho Seco nuclear power plant site. The nearest noise sensitive uses are a mobile home on Clay East Road, about 800 feet from the site boundary, and homes located on Kirkwood Street, about 5,100 feet away.

Linear Facilities

The CPP would connect with the SMUD electrical transmission system via the existing Rancho Seco switchyard.

The project would include construction of a 26-mile natural gas pipeline, in addition to two gas compressors and three valve stations. These facilities would be located primarily on agricultural lands, but may be in close proximity to houses or schools.

EXISTING NOISE LEVELS

In order to predict the likely noise effects of the project on adjacent sensitive receptors, the applicant commissioned ambient noise surveys of the area. The surveys were conducted during May 2001, April 2002, and June 19-20, 2002. The noise surveys were conducted using Bruel & Kjaer and Larson Davis sound level meters meeting the requirements of the American National Standards Institute (ANSI) for Type 1 sound level measurement systems. The measurements were performed at heights of approximately five feet above ground level to simulate the average height of the human ear (SMUD 2001a, § 8.5.3.1, SMUD 2002p §§ 2.5.1.2.1 and 2.5.2.2.1, SMUD 2002y). The applicant's noise survey monitored existing noise levels at the following five off-site monitoring locations, which are shown by **Noise Figures 1 – 4:**

1. Southern site boundary (M1).
2. Yolo County, near Winters compressor station (M2).
3. North side of Dwight Road, about 8,500 feet south of the Valve #190 (Elk Grove) compressor station (M3).
4. Residential area at Sea Forrest Way and McNamara Way about 1,200 feet from the Valve #190 (Elk Grove) compressor station (M4).
5. The residence at 11615 Kirkwood Street (R2 and M5), about 5,000 feet from the project boundary.

Noise Table 3 summarizes the ambient noise measurement results (SMUD 2001a, § 8.5.2.2, and Appendix 8.5A, SMUD 2002p §§ 2.5.1.2.1 and 2.5.2.2.1, SMUD 2002y). The data for sites M1, M2, M3, and M5 are presented for the quietest contiguous 4-hour periods. At Site M4, the data represent the results of a series of 10-minute samples in the time period of 3 a.m. to 4 a.m. on two separate nights.

Noise Table 3 - Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA		
	Quietest Contiguous Nighttime Hours		CNEL
	L _{eq}	L ₉₀	
M1	37 - 47	28 - 35	55.6*
M2	32	31	54.3*
M3	42 - 64	41	66.5*
M4	33 - 43	30 - 32	55 - 60*
M5 (R2)	40 - 49	29 - 33	55 - 60*
* Energy Commission staff calculation or estimate			

In general, the environment in the immediate vicinity of the project site can be described as relatively quiet, especially at night. One mobile home (R1) is close to the project site and to monitoring site M1, while several single family residences are located on Kirkwood Street (near M5/R2), over 5,000 feet away. The applicant is currently in discussions with the property owners at R1 with the goal of relocating or vacating the mobile home (SMUD 2002o). A statement by the applicant as to the disposition of the mobile home is expected in July 2002.

In the vicinity of the proposed Winters gas compressor, the environment may be considered very quiet. There are three houses within about 1,600 feet of the compressor station. Another residence, formerly the Union House School building, is located about 1,700 feet away.

In the vicinity of the Valve #190 gas compressor (Elk Grove), the environment is relatively noisy near the roadways and railroad tracks, and relatively quiet in the residential area removed from traffic noise sources. The nearest homes are 800 to 900 feet north of the gas compressor site.

IMPACTS

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

Community Effects

General Construction Noise

Construction noise is usually considered a temporary phenomenon. In this case, the construction period for the CPP would occur in two phases of 24 month and 18 month durations, respectively. Sensitive receptors near the plant site and near the gas compressors could be affected by noise from these activities. Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours is commonly exempt from enforcement by local ordinances. Sacramento County regulates the permissible hours of construction, but does not have any specific noise limits during those hours.

The applicant has prepared an analysis of construction noise impacts, listing predicted noise levels due to specific types of equipment and of generalized construction activities. The construction noise analysis results are summarized for the most-affected residential receptor locations during the busiest periods of construction in **Noise Table 4**. It is assumed that the noise levels experienced at more distant receivers would be lower than those shown by **Noise Table 4**.

The worst-case noise exposures would occur if several pieces of equipment were in use at a given time, in close proximity to one another. The predicted construction sound levels would result in cumulative noise levels within the range of the ambient daytime noise level conditions at locations R2 and M4. The construction noise levels would exceed ambient noise levels at R1 and M2. These increases would be perceptible in any case because of the differences in frequency content as compared to ambient noise sources. The changes in ambient noise levels would be of a temporary nature. The unmitigated increases in ambient noise levels due to construction are potentially significant. However, because construction would be restricted to daytime hours by Condition of Certification **NOISE-8**, the noise effect of construction is considered to be less than significant.

The noise levels shown in **Noise Table 4** do not include the contribution of pile driving, as the applicant has indicated that pile driving may not be needed. If pile driving were needed, noise levels could be approximately 80 dBA at the nearest receptor. This level would exceed the range of ambient noise levels in most cases, and is potentially significant. However, pile driving typically occurs over a relatively short period (a few days), and is of a temporary nature. Because construction would be restricted to daytime hours by Condition of Certification **NOISE-8**, the noise effect of pile driving, if it occurs, is expected to be less than significant.

Based upon the potential noise impacts of construction, the Energy Commission staff recommends the inclusion of three Conditions of Certification (**NOISE-1**, **NOISE-2**, and **NOISE-8**) to monitor and mitigate potential construction noise impacts.

Noise Table 4 - Construction Noise Level Predictions

Construction Equipment/Phase	Predicted Average Noise Level, dBA			
	R1 Mobile home near Site Boundary 800 feet away	R2 Residence near Site Boundary 5,100 feet away	M2 Nearest home to Winters Gas Compressor 800 feet away	M4 Nearest home to Valve #190 Gas Compressor 1,200 feet away
Bulldozer	64	48	64	54
Front-end Loader	64	48	64	54
Trucks	62	46	62	52
Grader	61	45	61	51
Shovels	60	44	60	50
Generators	60	44	60	50
Derrick Crane	59	43	59	49
Mobile Crane	59	43	59	49
Concrete Pumps	57	41	57	47
Tractor	56	40	56	46
Paving Breaker	56	40	56	46
Paving Breaker – Quieted	49	33	49	39
Multiple sources- worst case*	68	52	68	58
Source: SMUD 2001a, Table 8.5-8.				
* Energy Commission staff estimates				

Because construction activity would be limited by the proposed Condition of Certification **NOISE-8**, and would be of limited duration, potential construction noise impacts to receptors in the CPP project area are considered to be less than significant.

Pile Driving Vibration

Conventional pile driving produces potentially significant ground-borne vibration at nearby receivers. In this case, the nearest potentially affected receptor (R1) is about 800 feet from the construction site, and vibration from pile driving would be potentially significant. At this time, pile driving is not anticipated (SMUD 2002a, § 8.5.4.2.2). If pile driving is proposed at a later date, staff will propose a Condition of Certification requiring compliance with the vibration level criteria described by the Federal Transit Administration guidelines listed at the beginning of this section.

Steam Blows

Typically, the steam blows during construction and start-up create the loudest noise encountered during the construction phase. Steam blows are necessary after erection and assembly of the feedwater and steam systems because the piping and tubing that comprises the steam path accumulate dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were to start up without

thoroughly cleaning out the piping and tubing, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High-pressure steam is then raised in the heat recovery steam generator (HRSG) or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

In recent years, a new, quieter steam blow process, variously referred to as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of 36 hours or so. Resulting noise levels reach only about 80 dBA at 100 feet; noise levels at nearby receptors are typically similar to the daytime ambient background noise level, and thus barely noticeable. Even more recently, compressed air has been substituted for steam in the continuous blow process; resulting noise levels are similar.

According to the applicant, un-silenced high pressure steam blow noise levels could be as high as 105 dBA at the nearest receiver (R1). With an appropriate silencer, such as a Fluid Kinetics Model TBS 16-AC, or similar, the noise levels could be reduced by 40 to 45 dBA, or to a level ranging from 60 to 65 dBA at the nearest residence (SMUD 2001a, § 8.5.4.2.2). The resulting noise levels would be in the range of conversation sound levels, during daytime hours. The steam blow noise levels could therefore interfere with speech outdoors.

The applicant has proposed to mitigate the noise generated from construction steam blows by use of a silencer similar to that described above. Energy Commission staff proposes that any high pressure steam blows be muffled with an appropriate silencer, and that they be performed only during daytime hours to minimize annoyance to residents (see proposed Condition of Certification **NOISE-4** below).

Energy Commission staff further proposes a notification process to make neighbors aware of scheduled steam blows (see proposed Condition of Certification **NOISE-5** below).

Linear Facilities

A new natural gas line would be installed from the existing SMUD pipeline near the cogeneration facility in Elk Grove, to the project site.

Trenching for the proposed pipeline would involve use of diesel-powered equipment. Noise produced during the use of this equipment would be limited by recommended Condition of Certification **NOISE-8**.

The applicant has indicated that horizontal drilling will be required for the natural gas line in four locations, and that this activity would occur continuously (24 hours per day)

over a period of less than one week at each location. The noise source associated with this activity would be the engine driving the drill rig. This noise source is potentially significant. The drill rig could be located about 900 feet from the nearest residence. If the drill rig were fitted with adequate mufflers, and if the receptors were shielded from the noise of the drill rig, it is not expected that the noise due to horizontal drilling would be significant. For example, assuming a standard adequately muffled engine-powered drill rig, the maximum predicted noise level at 900 feet would be about 61 dBA. Shielding could reduce the noise level to less than 56 dBA. However, to ensure that horizontal drilling would not result in significant noise effects, the Energy Commission staff recommends the specific requirements of Condition of Certification **NOISE-8**.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (SMUD 2001a, § 8.5.4.2.1). To ensure that construction workers are, in fact, adequately protected, Energy Commission staff proposes Condition of Certification **NOISE-3**.

PROJECT SPECIFIC IMPACTS — OPERATION

Community Effects

The applicant has incorporated noise reduction measures into the design of the project. The applicant intends to achieve noise level standards that will prevent a significant noise impact, since the allowable noise levels under LORS could be substantially higher than existing background noise levels.

Power Plant Operation

During its operating life, the CPP represents essentially a steady, continuous noise source day and night. Occasional brief increases in noise levels would occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels would decrease.

The primary noise sources anticipated from the facility include the combustion turbines, the auxiliary boiler, steam turbine generators, relief valves, circulating water pumps, cooling towers, and the brine concentrator compressor. The noise emitted by power plants during normal operations is generally broadband, steady state in nature. The resulting hourly average noise levels are typically dominated by the steady-state noise sources.

The applicant performed acoustical calculations to determine the facility noise emissions, and to develop noise mitigation measures. The calculations were based on typical manufacturer noise data for the major equipment planned for the facility (SMUD 2001a, § 8.8.3.4). The modeling assumed that the units would be operated at full load. This is quite conservative, as actual power generation requirements vary with the time of day and electrical demands. Specific noise mitigation measures evaluated by the applicant included:

- Enclosing combustion turbines to meet 85 dBA at 3 feet

- Installing silencers on relief valve stacks
- Installing Totally Enclosed Water/Air Cooled motors on circulating water pumps
- Designing major components to limit noise to less than 90 dBA at 3 feet
- Locating the power block in central portion of site
- Locating the cooling towers on east side of site

The applicant stated that the initial baseline noise levels used for the analysis are representative of the normal in-situ performance of standard equipment. That is, the equipment was not upgraded or specially improved to reduce noise (SMUD 2001a, § 8.5.4.3.3).

The project has been re-designed since the AFC was submitted, which changed the orientation of some equipment on the plant site. The applicant stated that the revised footprint would not substantially change the projected noise contours, and that the noise levels would be slightly quieter with the new configuration (SMUD 2002j). Energy Commission staff reviewed the applicant's analysis, and agreed with the applicant.

The proposed gas compressors would be installed in Phase 2 of the project. The compressors would be electrically-driven, and would be of a reciprocating pump design. The applicant proposes to enclose the compressor units, and to provide other noise attenuation design features as needed to achieve noise limits at the nearest residences of 37 dBA (for the Winters unit) and 40 dBA (for the Elk Grove unit) (SMUD 2002p, §§ 2.5.1.3.3 and 2.5.2.3.3).

Noise Table 5 lists the predicted project noise levels at the nearest sensitive receptors in terms of the background noise level (L_{90}). The predicted project noise level at site R1 is about 62 dB DNL/CNEL. At the other sites listed below, the predicted project noise level is less than 55 dB DNL/CNEL. The predicted noise levels include the applicant's proposed mitigation measures, listed above. It is assumed that the noise levels experienced at more distant receivers would be lower than those shown by **Noise Table 5**.

Based upon the predicted noise levels at the nearest receptors, Energy Commission staff believes that the operation of the power plant, as proposed, would result in substantial increases in background noise levels at the nearest sensitive receptors (R1 and R2). The resulting noise levels at Site R1 would also exceed the 45 dBA nighttime standard of the Sacramento County Noise Element.

At Site M2, which represents the potential exposure for several houses, the gas compressor noise level is predicted to be 38 dBA. This noise level is within the range of existing daytime noise levels, and is not expected to result in speech or activity interference either inside or outside the houses.

The applicant provided a listing of the modeled plant noise levels at receptor R2 (SMUD 2002o). These data showed that the dominant noise sources would be the gas compressor and "Condenser Areas 1 and 2". Other significant sources included the generators and HRSG units. No "additional noise abatement" was listed for any of

these sources. It therefore appears that additional noise abatement could be provided to reduce the overall plant noise.

Noise Table 5 – Summary of Predicted Operational Noise Levels

Nearest Sensitive Receptor Sites	Nighttime L ₉₀ , dBA			
	Ambient	Project	Cumulative	Change
R1 – Mobile Home	32*	56	56	+24
R2- 11615 Kirkwood Road	31	42	42	+11
M2 - Winters	31**	37	38	+7
M4 – Elk Grove	32	40	41	+9
Source: SMUD 2001a, 2002p, 2002r. * - Average of values for the four quietest contiguous hours at M1. ** - Average of values for the four quietest contiguous hours. <i>Note that plant operation noise affects sites R1 and R2. The only project-related noise sources affecting sites M2 and M4 are in-line gas compressors.</i>				

The proposed Condition of Certification **NOISE-6** would require that the noise level produced by the plant operation not exceed 39 dBA L_{eq} at any residence. This would ensure that the cumulative nighttime background noise level (L₉₀) at any residential receptor would not increase by more than 9 dBA, and that noise due to the plant operations would not exceed the standards of the Sacramento County Noise Element at any sensitive receptor. The resulting change in ambient noise levels of 9 dBA would be noticeable, but not necessarily annoying in and of itself.

The proposed Condition of Certification **NOISE-6** would also require that the noise level produced by the Elk Grove (Valve 190 Station) gas compressor operation not exceed 39 dBA L_{eq} at any residence, as proposed by the applicant. This would ensure that the cumulative nighttime background noise level (L₉₀) at any residential receptor would not increase by more than 8 dBA, and that noise due to the gas compressor would not exceed the standards of the Elk Grove Noise Element at any sensitive receptor.

In the vicinity of the Winters gas compressor, the proposed Condition of Certification **NOISE-6** would require that the noise level produced by the gas compressor operation not exceed 37 dBA L_{eq} at any residence, as proposed by the applicant. This would ensure that the cumulative nighttime background noise level (L₉₀) at any residential receptor would not increase by more than 7 dBA, and that noise due to the gas compressor would not exceed the standards of the Yolo County Noise Element at any sensitive receptor.

Specifically, implementation of the proposed Condition of Certification **NOISE-6** would result in the noise levels shown in **Noise Table 6**.

Noise Table 6 - Conditioned Plant Operational Noise Levels and Resulting Ambient Noise Levels

Site	Noise Level, dBA			
	4-Hour Background Noise Level	Permitted Plant Noise Level	Cumulative	Resulting Increase in Ambient Noise Levels
R1 – Mobile Home	32	39	40	+8
R2 – 11615 Kirkwood Street	31	39	40	+9
M1 – Winters	31	37*	38	+7
M2 – Elk Grove	32	39	40	+8
* Proposed by applicant.				

Energy Commission staff believes that achieving the noise limits as required by **NOISE-6** would ensure that noise impacts would be less than significant. Staff recognizes that a noise level of 40 dBA or less would be considered quiet, and notes that the proposed noise limit is intended to ensure that the noise from the power plant or gas compressor would not constitute an annoyance to a reasonable person accustomed to the pre-project noise environment. Application of a noise limit of 40 dBA is consistent with the recommendations of the California Model Community Noise Control Ordinance for rural residential environments.

Other factors that were considered in reaching this conclusion were:

1. No unusual noise duration or frequency characteristics are predicted for the project.
2. There will be a relatively small number of people potentially affected by power plant and gas compressor noise.
3. In the project site area and the Winters area, the potentially affected residences are adjacent to agricultural lands. In Elk Grove, the potentially affected residential area is adjacent to the Union Pacific main line railroad track and a busy arterial (Franklin Boulevard). In all cases, permitted uses in the adjacent lands would be allowed (under LORS) to produce noise levels exceeding the observed ambient conditions.
4. No specific concerns about the predicted plant noise levels have been expressed by the public or other government agencies.

Energy Commission staff prefers that power plant noise level reductions be achieved by applying on-site noise abatement measures. To date, the applicant has provided no technical or feasibility data to support a determination that the lower noise levels required by the recommended Conditions of Certification cannot be attained.

Staff believes, on the basis of Energy Commission experience with other power plants, that significant additional noise reduction can be achieved using a variety of measures, such as those listed below:

- low-noise equipment such as pumps and electrical transformers

- quieter gas turbine inlet air mufflers
- noise attenuating vents on turbine generator enclosures
- noise lagging on the HRSG transition ducts
- low noise cooling fans for the cooling tower that incorporate additional fan blades or specially-designed “super low noise” fans combined with noise-reducing motor enclosures
- noise barriers adjacent to either sources or receivers

The applicant has not stated whether such measures have been considered in the plant acoustical design, nor whether they consider them to be feasible. Staff notes that the above design features have been technologically feasible for other power plant installations.

However, staff recognizes that at receiver R1 (the adjacent mobile home), that even with the addition of the additional noise reduction measures listed above, power plant noise levels may still exceed 39 dBA. On-site noise abatement measures, combined with a noise barrier at the receiving property line, would probably provide the maximum feasible extent of noise reduction. SMUD is currently negotiating with the landowner to relocate the residence in order to eliminate the impact, however, at this time the negotiations have not been finalized.

Applicant’s Proposed Mitigation

The applicant has offered to provide additional sound attenuation at receptors where post-project noise levels would exceed ambient noise levels by 5 dBA, and where residents complain of disturbance from increased noise due to the project (SMUD 2001a, § 8.5.5). The specific attenuation measures would be case-specific, and could include installation of weather-stripping, acoustically-rated windows and doors, sound insulation in walls and ceilings, attic vent baffles, and provision of mechanical ventilation. These treatments could be expected to reduce interior noise levels by 5 to 10 dBA. However, the applicant has provided no indication that the affected receptors are willing to accept the proposed measures.

Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant has stated that no strong tonal noises will be generated during the operation of the project.

The applicant has stated that steam relief vents would be silenced to mitigate the intermittent noise from pressure relief valves (SMUD 2001a, § 8.5.4.3.3). Although these noise sources are expected to be in compliance with the LORS, their noise effects may be significant in the context of the quiet ambient noise environment. For example, data presented in other AFC documentation indicate that mitigated steam relief valve noise levels would be in the range of 64 to 67 dBA at a distance of 100 feet. At the

nearest sensitive receptor (R1), the predicted mitigated noise level would be about 46 to 49 dBA. This range of noise levels would be audible, but would not be expected to result in startle or sleep disturbance (inside the home). At receptor R2, the predicted mitigated noise level would be in the range of 30 to 33 dBA, which would be subjectively very quiet outdoors.

To ensure that no strong tonal noises are present and that intermittent noises are mitigated, Energy Commission staff proposes Condition of Certification (**NOISE-6**, below), which requires the applicant to mitigate pure tones and the noise from steam relief valves.

Linear Facilities

The electrical output of the plant would be connected to the existing SMUD transmission lines, and would have no significant effect on corona discharge hum, which is expected to be audible only within 100 feet of the power lines.

Worker Effects

The applicant recognizes the need to protect plant operating and maintenance personnel from noise hazards, and has committed to comply with applicable LORS (SMUD 2001a, § 8.5.4.2.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. The applicant would implement a comprehensive hearing conservation program. To ensure that construction workers are, in fact, adequately protected, Energy Commission staff proposes Condition of Certification **NOISE-7**, below.

CUMULATIVE IMPACTS

Section 15130 of the *CEQA Guidelines* (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The *CEQA Guidelines* require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

Pursuant to CEQA, a cumulative impacts analysis can be performed by either 1) summarizing growth projections in an adopted general plan or in a prior certified environmental document, or 2) compiling a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Staff Assessment.

The AFC identified no planned projects that could contribute to cumulative noise impacts in the project study area, and staff agrees this is the case.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed Cosumnes Power Plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment). However, as indicated in

Socioeconomics Figure 1, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information that shows the low-income population is less than fifty percent within the same radius. The residences in these pockets or clusters are located farther from the project noise sources than the nearest sensitive receptors identified in the noise analysis, and would be exposed to lower noise levels than described for those receptors.

Based on the noise analysis, staff has identified a potentially significant direct impact resulting from the operation of the project, but with the mitigation proposed in the Conditions of Certification, the impact would be reduced to less than significant. Therefore, there is no potential disparate impact on the minority population, and there are no noise environmental justice issues related to this project.

FACILITY CLOSURE

In the future, upon closure of the CPP, all operational noise from the entire CPP site would cease, and no further adverse noise impacts from operation of the CPP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the CPP, it can be treated similarly. That is, noisy work can be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that are in existence at that time would apply; applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that the CPP, with the recommended mitigation, could be built and operated to comply with all applicable noise laws, ordinances, regulations, and standards, except at Receptor R1. Energy Commission staff further concludes that if the CPP facility were designed as described above, and further mitigated as described below in the proposed Conditions of Certification, it would not be expected to produce significant adverse noise impacts, except at Receptor R1. However, SMUD is currently negotiating with the landowner to relocate the residence in order to eliminate the impact, although at this time, negotiations have not been finalized. If the residence is relocated, the following COCs will ensure compliance with all applicable noise LORS, and ensure that the project would not result in a significant increase in ambient noise levels.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify by mail all residents within one-half mile of the site and the linear facilities of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner

shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project manager, stating that the above notification has been performed, and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within 5 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program. The project owner shall make the program available to Cal-OSHA upon request.

NOISE-4 If a traditional, high-pressure steam blow process is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the

noise of steam blows to no greater than 65 dBA, measured at any residential receptor. The project owner shall conduct steam blows only on weekdays during the hours of 6 a.m. to 8 p.m., unless the CPM agrees to longer hours based on a demonstration by the project owner that off-site noise impacts will not cause annoyance.

If a low-pressure continuous steam blow process is proposed, the project owner shall submit a description of this process, with expected noise levels and projected period of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise level does not exceed 45 dBA at any residence. If the low-pressure process is approved by the CPM, the project owner shall implement it in accordance with the requirements of the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM and Sacramento County drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

NOISE-5 Prior to the first high-pressure steam blow(s), the project owner shall notify all residents or business owners within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner.

The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Project owner shall notify residents and businesses at least 15 days prior to the first high-pressure steam blow(s). Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

NOISE-6 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the noise level produced by operation of the project will not exceed an hourly average noise level of more than the following values, measured at any sensitive receptor.

For the power plant operation: 39 dBA
For the Winters gas compressor: 37 dBA
For the Valve #190 gas compressor: 39 dBA

No new pure tone components may be introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate

complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints.

- A. Within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at Sites R1, R2, M2 and M4. The noise surveys shall also include short-term measurement of one-third octave band sound pressure levels at each of the above locations to ensure that no new pure-tone noise components have been introduced.
- B. If the results from the noise survey indicates that the noise level due to the plant operations exceeds the noise standard listed above for any given hour during the 25-hour period, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.
- C. If the results from the noise survey indicates that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: Within 15 days after completing the post-construction survey, the project owner shall submit a summary report of the survey to the Sacramento County, Yolo County and City of Elk Grove Planning Departments, and to the CPM. Included in the post-construction survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 15 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-7 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

NOISE-8 Noisy construction or demolition work shall be restricted to the times of day delineated below:

Weekdays	6 a.m. to 8 p.m.
Saturdays	7 a.m. to 8 p.m.
Sundays and holidays	8 a.m. to 8 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Horizontal drill rigs may be operated on a continuous basis, provided that the rigs are fitted with adequate mufflers and engine enclosures, and that the rigs are shielded from view of residences by berms, canal banks or other suitable barriers. If no such shielding is provided, horizontal drill rig operation shall be limited to the hours stated above.

Verification: The project owner shall transmit to the CPM in the first Monthly Construction Report a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Cosumnes Power Plant Project (01-AFC-19)		
NOISE COMPLAINT LOG NUMBER _____		
Complainant's name and address:		
Phone number: _____		
Date complaint received: _____ Time complaint received: _____		
Nature of noise complaint:		
Definition of problem after investigation by plant personnel:		
Date complainant first contacted: _____		
Initial noise levels at 3 feet from noise source _____ dBA	Date: _____	
Initial noise levels at complainant's property: _____ dBA	Date: _____	
Final noise levels at 3 feet from noise source: _____ dBA	Date: _____	
Final noise levels at complainant's property: _____ dBA	Date: _____	
Description of corrective measures taken:		
Complainant's signature: _____		Date: _____
Approximate installed cost of corrective measures: \$ _____		
Date installation completed: _____		
Date first letter sent to complainant: _____ (copy attached)		
Date final letter sent to complainant: _____ (copy attached)		
This information is certified to be correct:		
Plant Manager's Signature: _____		

(Attach additional pages and supporting documentation, as required).

REFERENCES

County of Sacramento. 1993. Noise Element of the Sacramento County General Plan.

County of Yolo. 1975. Noise Element of the Yolo County General Plan.

County of Sacramento. Chapter 6.68 of the Sacramento County Code.

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Federal Transit Administration. 1995. *Transit Noise and Vibration Impact Assessment*. DOT-T-95-16. Harris, Miller, Miller and Hanson, Inc. Burlington, Massachusetts.

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State of California. 1977. Model Community Noise Control Ordinance, Office of Noise Control, April 1977.

NOISE APPENDIX A

FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (Leq), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (Ldn). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical Ldn values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971). At 70 dBA, sleep interference effects become considerable.

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L ₁₀ , L ₅₀ , & L ₉₀	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L ₉₀ is generally taken as the background noise level.
Equivalent Noise Level, L _{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L _{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

SUBJECTIVE RESPONSE TO NOISE

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships (Kryter 1970) can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

COMBINATION OF SOUND LEVELS

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3 Addition of Decibel Values	
When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

SOUND AND DISTANCE

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source ten times reduces the sound pressure level by 20 dB.

WORKER PROTECTION

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.95

Insert

Noise Figure 1 - AFC Figure 8.5-1

Noise Figure 2 - AFC Supplement B Figure 2.5-1

Noise Figure 3 - AFC Supplement B Figure 2.5-2

Noise Figure 4 - AFC Supplement B Figure 2.5-3

PUBLIC HEALTH

Alvin J. Greenberg, Ph.D.

INTRODUCTION

The purpose of staff's public health analysis is to determine if toxic emissions from the proposed Cosumnes Power Plant (CPP) project would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this Preliminary Staff Assessment (PSA). Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soils and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

The following sections describe staff's method of analyzing potential health impacts and the criteria used to determine their significance.

METHOD OF ANALYSIS

Public health staff is concerned about toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no air quality standards have been set are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a process known as health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment procedure consists of the following steps:

1. Identify the types and amounts of hazardous substances that the CPP project could emit to the environment;
2. Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;

3. Estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
4. Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant would be much lower than the risks that are estimated by the screening level assessment. This is accomplished by examining conditions that would lead to the highest, or worst-case risks, and then using those in the study. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are calculated to be the highest;
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- Assuming that an individual's exposure to cancer-causing agents occurs for 70 years.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (see CAPCOA 1993, Table III-5). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: noncancer health effects, both acute (short-term) and chronic (long-term), and cancer risk (also long-term). Acute health effects result from short-term (1-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse

health effects (CAPCOA 1993, p. III-36). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions. In reality, the risk is generally too small to actually be measured. For example, the one in one million risk level represents a one in one million increase in the normal risk of developing cancer over a lifetime, at whatever location is estimated to have the worst-case risk.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called "potency factors", and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be lower or even considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. Significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index.” A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels (safe levels). Under these conditions, health protection is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations, § 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6} . An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the various Air Boards in California pursuant to Health and Safety Code § 44362(b), which requires notification of nearby residents when an air district determines that there is a significant health risk from a facility. In addition, Sacramento Metropolitan Air Quality Management District’s Risk Management Policy states that a project with an incremental cancer risk of between one and ten in a million is acceptable if best available control technology has been applied to reduce risk. In general, Sacramento Metropolitan Air Quality Management District would not approve a project with a cancer risk exceeding ten in one million.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

Clean Air Act section 112 (42 U.S. Code section 7412)

Section 112 requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).

STATE

California Health and Safety Code sections 39650 et seq.

These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.

California Health and Safety Code section 41700

This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”

LOCAL

Sacramento Metropolitan Air Quality Management District (SMAQMD) administers California H&SC 41700 with California Air Resources Board (CARB) overview.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The proposed CPP site is located on approximately 30 acres of a portion of a 2,480-acre area in southern Sacramento County, about 25 miles southeast of Sacramento. The property is owned by the Sacramento Municipal Utility District and is located about 0.5 miles south of the former Rancho Seco nuclear power plant. The project site is located about four miles north of the San Joaquin County line and 5 miles west of the Amador County line. Access to the site is via two roads leading from Clay East Road. Site topography gradually slopes downhill from northeast to southwest. The locale is sparsely populated and generally agricultural, with incorporated and unincorporated low-density urban and suburban areas.

Land use at the site is designated Public/Quasi-Public with a Resource Conservation overlay which is consistent with the Agricultural zoning of the location. The project site is currently used for cattle grazing. While a power plant project is not a defined use for this zoning district, the proposed project is an allowable use for this zoning designation, per Section 205-09 of the Sacramento County Zoning Ordinance. In addition, this property was formerly used for power production.

Sacramento County is located within the Sacramento Valley Air Basin, which is surrounded by the Coastal Mountain Range to the west, the Sierra Nevada to the east, the Cascade Range to the north, and the San Joaquin Valley Air Basin to the South. The Sacramento Valley is classified as a moderate Mediterranean Climate, characterized by hot, dry summers and cool, rainy winters.

Few residences are located in the vicinity of the site. The nearest residence is a mobile home located about 800 feet southwest of the CPP site. The next nearest residences are located about one mile to the west and southwest of the project. The nearest local communities are Rancho Murieta to the north, the town of Lone to the east and Lockeford to the south. The location of sensitive receptors (such as school, hospitals, day care facilities, nursing homes, etc.) near the proposed site is also an important factor in considering potential public health impacts. No sensitive receptors were identified within a 3-mile radius of the project site. However as noted earlier, health based standards are meant to protect every sensitive member of the population, not just those located at sensitive receptor locations.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

The climate at the project site is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, which is a semi-permanent, subtropical high-pressure system located off the coast. The size and strength of the Pacific high is at a maximum during the summer, when it is at its northernmost position, and results in strong northwesterly airflow and negligible precipitation. During this period, inversions become strong, winds are light, and the pollution potential is high. The Pacific high's influence weakens during the fall and winter when it moves southwestward, which allows storms from the Gulf of Alaska to reach northern California. About 80 percent of the region's annual rainfall occurs between November and March. During the winter, inversions are weak, winds often moderate, and the potential for air pollution is low.

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of SMAQMD. By examining average toxic concentration levels from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 4, or 250,000 in one million.

The toxic air monitoring station closest to the CPP project is on Hazelton Street in Stockton, approximately 30 miles southwest of the CPP site. Based on levels of toxic air contaminants measured at this monitoring station in 2000, the background cancer risk calculated for this location is 185 in one million (CARB 2002). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources (cars, trucks, and buses), were the two highest contributors to risk and together accounted for over half of the total. The risk from 1,3-butadiene was about 58 in one million, while the risk from benzene was about 54 in one million. Formaldehyde accounts for about 6.5 percent of the ambient cancer risk determined for Stockton, with a risk of about 12 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed CPP. Since the CPP is not located in an urban area like Stockton, traffic and industrial emissions are considerably less. Consequently, the background cancer risk would also be considerably less. In the absence of an on-site monitoring station, staff concludes that the Stockton monitoring station represents the best estimate of

background cancer risk for comparison purposes, noting that the actual risk for the rural area of the CPP would be much less.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years. For example, at the Stockton monitoring station, cancer risk was 376 in one million based on 1991 data, 212 in one million based on 1996 data, and 185 in one million based on the 2000 data.

SITE CONTAMINATION

Site disturbances would occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances.

On behalf of SMUD, a Phase I Environmental Site Assessment (ESA) was conducted by B. Demar Hooper, Esq., Taylor, Hooper & Wiley. Information was obtained during a site visit by visual inspection and interview of long-time employees of the Rancho Seco Plant. Data was collected pursuant to American Society for Testing and Materials Standard E 1527-00, Standard Practice for Environmental Site Assessments (Reliant 2001a, Appendix N). The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities. The results of the ESA are summarized below and in detail in staff's **Waste Management** section.

IMPACTS

CONSTRUCTION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

As described in the **Waste Management** section, a Phase I Environmental Site Assessment (ESA) has been performed. The ESA was found by staff to be inadequate and therefore staff requested that the applicant conduct soil sampling and analysis to ensure that site preparation activities will not pose a significant risk to on-site workers or the off-site public. The applicant provided additional information as part of their Data Response (SMUD 2002z), which staff reviewed and evaluated. Staff agrees that this data supports the applicant's position that migration of hazardous waste and/or radioactive waste from the Rancho Seco nuclear power plant to the proposed site and laydown areas did not occur in the past. Therefore, staff finds it unnecessary for the applicant to conduct a sampling and analysis plan at the proposed site and laydown areas. Staff believes that standard Waste Management Conditions of Certification which require having a Registered Professional Engineer or Geologist with experience

in remedial investigation and feasibility studies available for consultation during soil excavation and grading activities are adequate to address any soil or groundwater contamination that may be encountered. The applicant also provided a modified Phase I ESA for the 26-mile pipeline which demonstrated that minimal hazardous wastes are expected to be encountered during construction of the facility and gas pipeline (SMUD 2002z).

The operation of construction equipment would result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. EPA as hazardous air pollutants and by the Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust causes both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants (SRP) recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of $5 \mu\text{g}/\text{m}^3$ and a cancer unit risk factor of $3 \times 10^{-4} (\mu\text{g}/\text{m}^3)^{-1}$ (SRP 1998, p. 6). The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, the ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of Phase I and Phase II of CPP is anticipated to take place over a period of 24 and 18 months, respectively. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from seven to seventy years.

AFC Appendix 8.1A presents diesel exhaust emissions from engines and fugitive dust from construction activities. Worst-case daily dust emissions of 49.6 lb/day PM₁₀ are expected to occur in month five. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Modeling construction activities gives an annual maximum total predicted concentration of PM₁₀ of $30.6 \mu\text{g}/\text{m}^3$ ($5.5 \mu\text{g}/\text{m}^3$ calculated added to a background of $25.1 \mu\text{g}/\text{m}^3$) (SMUD 2001a, Table 8.1A-5). Mitigation measures are proposed to reduce the maximum calculated PM₁₀ concentrations. These include the use of extensive fugitive dust control measures (stipulated by SMAQMD rule 403). The fugitive dust control measures are assumed to result in 90% reductions of emissions.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, staff recommends the use of ultra low sulfur diesel fuel and the installation of soot filters on stationary diesel equipment. The

catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92 percent. Such filters would reduce diesel emissions during construction and reduce any potential for significant health impacts.

Operation

Emissions Sources

The emissions sources at the proposed CPP project include:

- four gas turbines with heat recovery steam generators
- two condensing steam turbine generators
- cooling towers

During operation, potential public health risks are related to natural gas combustion emissions from the gas turbines and duct burners.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 8.6-3 of the AFC lists non-criteria pollutants that may be emitted from CPP project turbines as combustion byproducts. Emission factors used in the analysis are from CARB and U.S. EPA. Table 8.6-4 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include reference exposure levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the CAPCOA Guidelines (CAPCOA 1993).

Public Health Table 1 lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but that if it is inhaled, it may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

Annual average and 1-hour emission rates used are presented in the health risk assessment program output included in Appendix 8.1E. Emission factors are estimates of the amounts of toxic substances released per unit of fuel burned and are from data compiled by the CARB and U.S. EPA.

Public Health Table 1
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✓	✓	
Acrolein				✓	✓
Ammonia				✓	✓
Arsenic	✓	✓	✓	✓	✓
Benzene			✓	✓	✓
1,3-Butadiene			✓	✓	
Cadmium			✓	✓	
Chromium			✓	✓	
Copper				✓	✓
Ethylbenzene				✓	
Formaldehyde			✓	✓	✓
Hexane				✓	
Lead			✓	✓	
Mercury				✓	✓
Napthalene		✓		✓	
Nickel			✓	✓	✓
Polynuclear Aromatic Hydrocarbons (PAHs)	✓		✓		
Propylene				✓	
Propylene oxide			✓	✓	✓
Toluene				✓	✓
Xylene				✓	✓
Zinc				✓	

Source: SMUD 2001a, Table 8.6-4 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines, October 1993 and SRP 1998.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The screening analysis was performed using the U.S. EPA approved ISCST3 dispersion modeling program (please see staff’s **Air Quality** section for a detailed discussion of the modeling methodology). Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother’s milk.

The above method of assessing health effects is consistent with the California Air Pollution Control Officers Association (CAPCOA) Air Toxics “Hot Spot” Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and results in the following health risk estimates.

Impacts

The screening health risk assessment prepared by the applicant for the project, including combustion and non-combustion emissions, resulted in a maximum acute hazard index of 0.10 about 0.12 miles south of the project boundary. The chronic hazard index at the point of maximum impact is 0.015. The location of the maximum chronic hazard is about 1.4 miles northeast of the site boundary (SMUD 2001a, Figure 8.1E-1). As **Public Health Table 2** shows, both acute and chronic hazard indices are under the REL of 1.0, indicating that no short- or long-term adverse health effects are expected.

Public Health Table 2
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
ACUTE NONCANCER	0.10	1.0	No
CHRONIC NONCANCER	0.015	1.0	No
INDIVIDUAL CANCER	0.26×10^{-6}	10×10^{-6}	No

Source: SMUD 2001a, Tables 8.1E-1 (revised), 8.1E-2 (revised) and 8.1E-3 (revised).

Cancer Risk

As shown in **Public Health Table 2**, total worst-case individual cancer risk is calculated to be 0.26 in one million at a location approximately 0.19 miles northeast of the project boundary. As noted earlier, the nearest residence is a mobile home located about 800 feet southwest of the project site.

The health risk assessment performed by the applicant has been reviewed by staff and was found to be in accordance with guidelines adopted by OEHHA (Office of Environmental Health Hazard Assessment), CARB, and CAPCOA with two exceptions. First, the risk assessment assumes that all chromium emitted is in the form of noncarcinogenic trivalent chromium. Emissions of trivalent and hexavalent chromium from the cooling tower should be included in order to accurately assess the risks from both forms of emitted chromium. Second, crop (fruits and vegetables) ingestion was not included as a potential exposure pathway in the risk assessment. In an agricultural area such as the project site, this exposure pathway should be evaluated. Staff performed an independent analysis of risks posed by operations of this proposed facility, conservatively assuming that all chromium emitted is in the hexavalent form and using standard Cal-EPA exposure assumptions for the crop ingestion pathway. The maximum theoretical cancer risk was determined by staff to be 0.67 in a million, a value higher than the 0.26 in one million value obtained by the applicant but still significantly lower than the significance level of 10 in a million. Therefore, staff finds that the health risk assessment prepared by the applicant in the AFC accurately concludes that the

maximum theoretical risks and hazards posed by the toxic air contaminants emitted by the three sources described above are less than the significance level of 10 in one million.

CUMULATIVE IMPACTS

The applicant's modeled residential maximum cancer risk for the CPP facility is 0.26 in one million, about 0.19 miles northeast of the proposed site (as noted, staff's independent estimate at the same location is 0.67 in one million). The maximum impact location occurs where pollutant concentrations from CPP would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer risk of 250,000 in one million. Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions, and overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk (under either modeling scenario) posed by the CPP project to be either significant or cumulatively considerable.

The worst-case long-term noncancer health impact from CPP (0.015 hazard index) is well below the significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any cumulative health impacts to be significant. As with cancer risk, long-term hazard would be lower at all other locations, and cumulative impacts at other locations would also be less than significant.

Even in the unlikely event that worst-case emissions from an existing facility were to coincide both geographically and temporally with CPP emissions at the location of maximum impact, the overall long-term health outlook would not change for anyone. Thus, the CPP project would not result in any significant cumulative cancer or chronic noncancer health impacts.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed CPP (please refer to **Socioeconomics** Figure 1 in this Staff Assessment). However, as indicated in **Socioeconomics** Figure 1, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information that shows the low-income population is less than fifty percent within the same radius. However, based on the **Public Health** analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no **Public Health** environmental justice issues related to this project.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the CPP project would be in compliance with all applicable LORS regarding long-term and short-term project impacts.

FACILITY CLOSURE

The scope of staff's public health analysis is limited to routine releases of harmful substances to the environment. During either temporary or permanent facility closure, the major concern would be from accidental or non-routine releases from either hazardous materials or wastes that may be onsite. These are discussed in the sections **Hazardous Materials** and **Waste Management**, respectively. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. For permanent closure, the only routine emissions would be related to facility demolition or dismantling, such as exhaust from heavy equipment or fugitive dust emissions. These would be subject to closure conditions adopted by the Energy Commission once a closure plan is received from the project owner.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

PUBLIC COMMENTS

Joe Rominger and Sheri Tall, residents of Winters, asked if there would be any health risks to residents living close to the 4,000+ horsepower compressor station proposed to be build by SMUD at their tap line into the PG&E natural gas line located on County Road 29 near Winters.

Response: The compressor that is proposed to be built near Winters would be electric-driven, and therefore, the operation of this compressor would not require any hazardous chemicals and there would be no toxic emissions. Impacts during the construction of a compressor station would be insignificant. It is staff's opinion that the construction and operation of the proposed compressor poses an insignificant risk to public. The risk of fire or explosion is discussed in the **Hazardous Materials Management** section of the staff assessment.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the CPP project, and does not expect there to be any significant adverse cancer, or short- or long-term noncancer health effects from project emissions.

The health risk assessment performed by the applicant has been reviewed by Energy Commission staff and was found to be in accordance with guidelines adopted by OEHHA (Office of Environmental Health Hazard Assessment), CARB, and CAPCOA with the exceptions noted above. Energy Commission staff performed an independent analysis of risks posed by operations of this proposed facility and found that the health risk assessment prepared by the applicant in the AFC accurately concludes that the project would not cause any significant public health risks.

Pursuant to the SMAQMD Risk Management Policy, the increased carcinogenic risk attributed to this project is considered to be not significant since it is less than 10 in one million. The chronic and acute hazard indices attributed to the emission of non-carcinogenic air contaminants are considered to be less than significant since they are less than 1.0. Therefore, the CPP facility is in compliance with the SMAQMD Toxic Risk Management Policy.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions are proposed.

REFERENCES

- California Air Resource Board (CARB). 2002. California Air Quality Data, <http://www.arb.ca.gov/aqd/aqd.htm>
- CAPCOA. 1993. California Air Pollution Control Officers Association. CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee. October.
- SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.
- SRP. 1998. Scientific Review Panel on Toxic Air Contaminants. Findings of the Scientific Review Panel on The Report On Diesel Exhaust as adopted at the Panel's April 22, 1998 Meeting.

SOCIOECONOMICS

Negar Vahidi

INTRODUCTION

This socioeconomic impact analysis evaluates the potential short- and long-term project-induced impacts on local housing, employment and population, schools, medical and protective services, as well as the fiscal and physical capability of local agencies to meet the needs of project-related population changes. The analysis includes demographic information, which is used in several technical areas, including this analysis, for a focused evaluation of Environmental Justice. The socioeconomic analysis also discusses the potential direct, secondary (indirect and induced) and cumulative impacts of the proposed Cosumnes Power Plant (CPP) on community resources and services.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

Executive Order 12898

Executive Order (E.O.) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on agencies to achieve environmental justice as part of this mission. The order requires the US Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations (E.O., 1994).

Civil Rights Act of 1964, Public Law 88-352, 78 Stat.241

(Codified as amended in various sections of 42 U.S.C.) Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national origin in all programs or activities receiving federal financial assistance.

STATE

Title 14 California Code of Regulations, Section 15131

- Economic or social effects of a project shall not be treated as significant effects on the environment.
- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.
- Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether

changes in a project are feasible to reduce and or avoid the significant effects on the environment.

LOCAL

There are no local socioeconomic LORS for the Counties of Sacramento, San Joaquin, and Amador applicable to the proposed CPP.

SETTING

PROJECT LOCATION

The proposed project site for the CPP would be located on approximately 30 acres of 2,480 acres owned by the Sacramento Municipal Utility District (SMUD). The decommissioned Rancho Seco Power Plant is situated approximately ½ mile north of the proposed CPP site. The site is in Sacramento County, approximately 4 miles north of San Joaquin County, and 5 miles west of Amador County.

DEMOGRAPHIC CHARACTERISTICS

Within the project area, the County of Sacramento is considered the area that may be most affected by potential population in-migration resulting from the proposed project. In addition, data for nearby Counties of Amador and San Joaquin is also presented. Historic and recent population figures for Counties of Sacramento, Amador, and San Joaquin are summarized in **Socioeconomics Table 1**.

Socioeconomics Table 1
Demographic Profile of the Study Area

Area	Year	
	1990 Population	2000 Population
County of Amador	30,039	35,100
County of Sacramento	1,041,219	1,223,499
County of San Joaquin	480,628	563,598
Source: US Census, 1990 and 2000. http://factfinder.census.gov/servlet/BasicFactsServlet		

Minority Population

Socioeconomics Table 2 provides minority population percentages for the State, County of Sacramento, and a six-mile radius of the proposed project. The six-mile radius largely encompasses a section of Sacramento County, but also includes parts of Amador and San Joaquin counties. The ethnic/racial profile is based on 2000 census data. Within the six-mile radius, 83.5 percent of the population is white, while the remaining 16.5 percent is comprised of non-white population. **Socioeconomics Figure 1** presents the census blocks within a six-mile radius of the proposed project with 50 percent or more minority population.

As shown in **Socioeconomics Figure 1**, several census blocks within the six-mile radius located within the County of Sacramento have a total minority population above 50 percent. Four census blocks in particular have 100 percent minority populations. These blocks, however, have total populations of nine, seven, five, and three, respectively.

Socioeconomics Table 2
Demographic Profile of Proposed Project Area, 2000

Area	Total Population	Minority Population
State of California	33,871,648	13,701,589 (40.5%)
Sacramento County	1,223,449	440,259 (36.0%)
6-Mile Radius	2,009	331 (16.5%) ¹
Source: U.S. Census, 2000. http://factfinder.census.gov/servlet/BasicFactsServlet		
* Minority definition derived from US Census Bureau by the California Energy Commission (CEC 2001)		
¹ California Energy Commission, Systems Assessment and Facilities Siting Division, Cartography Unit.		

Low-Income Population

For the purposes of this analysis, a household has been defined as *low-income* if its income is less than 80 percent of the median for that area. Median income data is provided by the U.S. Census and is defined as the middle value for a distribution of incomes (OMB, 1978; U.S. Census, 2000). Year 2000 economic census data remains unavailable, consequently, a household would be considered low-income if its annual income in 1989 was less than \$25,838 (U.S. Census, 1990). **Socioeconomics Table 3** summarizes the low-income population from 1990 census tracts within a six-mile radius of the proposed project. According to 1990 Census data, approximately 7.6 percent of the population within a six-mile radius of the proposed power plant site is considered low-income, as shown in **Socioeconomics Figure 2**. This is well below the 50 percent threshold that staff uses to determine if there is a low-income population of concern.

Socioeconomics Table 3
Low-Income Population Within Six-Mile Radius of Proposed Project, 1990

	Six-Mile Radius
Total Population	30,478
Low-Income Population	2,330 (7.6%)
*Low-Income defined as those with annual income less than \$25,838 (US Census, 1990).	
Source: U.S. Census 1990	

EMPLOYMENT CHARACTERISTICS

For the purposes of defining the affected socioeconomics project area for employment characteristics, it is assumed that most workers would be willing to make a 1 to 2 hour commute to the proposed project site. Counties within this 1 to 2 hour commute range include Sacramento, Placer, El Dorado, San Joaquin, Amador, Calaveras, Solano, and Yolo counties. **Socioeconomics Table 4** identifies labor force characteristics for this eight-county area for the year 1999. The statistics for Calaveras and San Joaquin counties indicate a civilian labor force with an unemployment rate above the state's unemployment rate of five percent (Employment Development Department, 2001b).

Nearby Sacramento, Placer, El Dorado, Amador, Solano, and Yolo counties show unemployment rates slightly below that of the entire State of California. The civilian labor force represents all residents between 18-55 years of age and currently employed.

Data presented in **Socioeconomics Table 4** indicates that for the total affected area, the services industry employs the highest number of people. In San Joaquin and Calaveras counties, agriculture employs the highest number of people, and in Yolo and

Amador counties, government employs the greatest number of people. In all eight counties, the top four employers are services, trade, government, and agriculture.

Socioeconomics Table 4
Labor Force Characteristics of Eight-County Study Area, 1999

Labor Force	Sacramento/ Placer/ El Dorado Counties	San Joaquin County	Amador County	Calaveras County	Solano County	Yolo County
Civilian labor force	812,600	260,800	14,190*	15,190	196,800	93,700
Unemployment	29,700 (4.2%)	23,000 (8.8%)	620 (4.4%)	1,010 (6.7%)	8,400 (4.2%)	4,100 (4.3%)
Agriculture	71,000	51,000	240	6,070	16,400	2,300
Construction	47,700	11,800	420 (w/ mining)	860 (w/ mining)	13,900 (w/ mining)	4,300
Manufacturing	50,300	25,500	870	490	20,600	6,100
Transportation/ public utilities	27,500	13,500	420	400	5,800	6,300
Trade	153,000	43,500	2,430	1,800	42,400	21,800
Finance/insurance	48,000	8,400	370	360	7,300	4,600
Services	202,300	47,000	2,580	1,860	48,000	15,000
Government	182,900	37,000	3,820	2,340	34,000	29,000
Other	200	100	0	0	0	200

Source: California Employment Development Dept., March 1999 Benchmark.

* Discrepancies between the civilian labor force and the total of all industries and unemployed is due to the fact that civilian labor force is by place of residence and includes self-employed individuals, unpaid family workers, household domestic workers, and workers on strike, while the industry employment totals are calculated by place of work and excludes self-employed individuals, unpaid family workers, household domestic workers, and workers on strike.

HOUSING

Socioeconomics Table 5 summarizes the housing unit totals for the counties of Sacramento, San Joaquin, and Amador as of January 1, 2000. Housing data is provided for the counties within the immediate vicinity of the proposed CPP as workers choosing not to commute would most likely relocate to areas nearby the project. As of January 2000, there were approximately 470,000 total housing units in Sacramento County, San Joaquin County had approximately 190,000 total housing units, and Amador County had approximately 15,000 total units. These totals include single-family, multi-family, and mobile home residences. Sacramento County had a vacancy rate of 6.1 percent, San Joaquin County had a vacancy rate of 5.0 percent, and Amador County had a vacancy rate of 18.0 percent. The vacancy rate of Sacramento and Amador Counties are above the federal housing standard of 5.0 percent.

FINANCIAL RESOURCES

Personal income earnings within the study area are summarized in **Socioeconomics Table 6**. As shown, personal income revenue by industry for Sacramento and San Joaquin counties is dominated by the industries of government and services. The services and government industries generate approximately one-half of non-farm personal income earnings in the project area. Construction activities also play an

Socioeconomics Table 5
Amador, Sacramento, and San Joaquin County Housing Units, 2000

	Total	Single-Family		Multi-Family		Mobile Home	Occupied	% Vacant	Persons Per Household
		Detached	Attached	2-4	5+				
County of Amador	15,113	12,076	289	466	680	1,602	12,395	18.0%	2.39
County of Sacramento	468,236	291,949	29,941	33,161	98,346	14,839	439,663	6.1%	2.70
County of San Joaquin	190,003	128,369	9,758	14,002	28,628	9,246	180,531	5.0%	3.05
Source: http://www.dof.ca.gov:8080/html/demograp/e%2D5.xls									

important incoming-producing role in the study area, cumulatively generating 6.35 percent of the total personal income.

Fiscal Revenue

Sacramento County has taxing authority for the property associated with the proposed project. **Socioeconomics Table 7** shows revenue collections and expenditures for Sacramento County broken out by revenue source for the 2000-2001 fiscal year. The total revenue for the 2000-2001 fiscal year was \$1.8 billion. The majority of funding for Sacramento County comes from Aid-Other Government agencies.

Socioeconomics Table 7 also shows expenditures by Sacramento County. Total financing requirements approached \$2 billion in the 2000-2001 fiscal year budget. Public assistance and public protection are the two largest function categories in the Sacramento County expenditure budget.

Socioeconomics Table 6
Personal Income Earnings By Industry for the County Study Area, 1997

Industry	County of Sacramento*	County of San Joaquin*
Farming	53,190	518,052
Agricultural Services	116,131	137,955
Services	5,929,775	1,459,205
Wholesale Trade	918,144	359,186
Retail Trade	1,809,391	703,932
Manufacturing	1,696,872	943,510
Government	7,108,992	1,190,052
Transportation & Public Utilities	1,027,912	573,623
Construction	1,284,670	430,859
Finance, Insurance & Real Estate	1,893,305	522,245
Mining	9,126	7,886
Total Non-Farm Earnings	21,794,318	6,328,453
Source: U.S. Department of Commerce, Bureau of Economic Analysis: Regional Economic Information Systems. http://govinfo.library.orst.edu/reis-stateis.html . 2001. N/A – Not Available *In thousands of dollars.		

**Socioeconomics Table 7
Sacramento County Budget**

	2000-2001 Fiscal Year (Millions)
REVENUE	
Current Secured Property Tax	120.5
Current Unsecured Property Tax	6.7
Supplemental Property Tax	3.3
Taxes (Other than Current Property)	183.4
Licenses and Permits	30.6
Fines, Forfeitures, and Penalties	20.1
Use of Money and Property	27.9
Aid-Other Government Agencies	1,121.8
Charges for Current Services	77.3
Miscellaneous Revenues	70.5
Other Financing Sources	12.2
TOTAL REVENUES	\$1,834.4
EXPENDITURES	
General	153.3
Public Protection	566.6
Public Ways & Facilities	143.6
Health & Sanitation	387.2
Public Assistance	606.3
Education	13.4
Recreational & Cultural	25.9
Debt Service	19.4
Total Specific Financing Uses	1,915.7
Appropriations for Contingencies	6.8
Provisions for Reserves	21.1
TOTAL FINANCING REQUIREMENTS	\$1,943.6
Source: SMUD 2001a, Table 8.8-10, 8.8-8.	

Taxes

In California, sales tax on purchases is collected by the seller and paid to the State. The sales and use tax rate in Sacramento County is 7.5 percent. This includes the total Statewide Base Sales Use Tax rate of 7 percent; plus 0.5 percent to the Sacramento Transportation Authority. Of the 7 percent Statwide Base Tax, 4.75 percent goes to the State General Fund, 0.5 percent to the State Local Revenue Fund, 0.5 percent to the State Local Public Safety Fund, and the remaining 1.25 percent goes to the local county or city (i.e., at place of sale) (SMUD 2001a, p. 8.8-7).

The proposed project site for the CPP would be located on a parcel owned by SMUD, a public agency, and is therefore not subject to property taxation by any local agency.

PUBLIC SERVICES

Police Protection

The Sacramento County Sheriff's Department, South Field Services provides law enforcement services for the project area. A Problem Oriented Police (POP) officer, whose responsibility is to provide proactive service and deal with specific local issues, is

assigned to the area, but is not responsible for responding to service calls. The zone serving the proposed project site is staffed with one officer in a patrol car 24-hours a day, 7 days a week. Response time to a service call at the site varies depending on the officer's location at the time of the call (SMUD 2001a, p. 8.8-9).

Schools

The site is located within the boundaries of the Galt Joint Union High School District (HSD) and the Arcohe Union Elementary School District. **Socioeconomics Table 8** shows the enrollment data by grade for both districts. As indicated within **Socioeconomics Table 8**, the HSD is currently over the total capacity of 1,517 students (SMUD 2001a, p. 8.8-7), and the Arcohe Union Elementary School District is within capacity (Avalos, 2002)

Socioeconomics Table 8
Galt Joint Union High School and Arcohe Union Elementary School Districts
Enrollment, 2001

Schools	Arcohe Union ES	Galt Joint Union HSD
Elementary (K-5 th)	352	-
Middle (6 th -8 th)	168	-
Senior High (9 th -12 th)	-	1,874
Total Enrollment	520	1,874
Stated Capacity	633	1,517
Source: SMUD 2001a, Table 8.8-11, p. 8.8-9; Avalos, 2002		

Hospitals

Major hospitals serving the project site include Kaiser Permanente Hospital and Methodist Hospital in south Sacramento, Lodi Memorial Hospital in Lodi, and Dameron Hospital and St. Joseph's Immediate Care in Stockton. The Galt Fire District provides emergency medical service (i.e., ambulance service) to the project area (SMUD 2001a, p. 8.8-10).

Electricity

The project site is within SMUD's electricity service area. The Rancho Seco Plant 230-kV switchyard will be used for electricity supply during construction and to deliver the power generated at the proposed project to the Northern California electric grid and the SMUD Transmission System (SMUD 2001a, p. 8.8-10).

Natural Gas

The project would be fueled by natural gas delivered to the site by a supply line to be constructed as part of the project. Natural gas will be obtained from Pacific Gas & Electric's (PG&E) transmission backbone pipelines 400 and 401 located near Winters, California, and transported through the Sacramento Municipal Utility District's 50-mile pipeline network. A 24-inch diameter pipeline will be constructed from the pipeline network tap point at Carson Ice-Generation Plant to the proposed project site (SMUD 2001a, p. 6-1).

Sewer

Domestic wastewater for the proposed project site would be treated with a package treatment system and leachfield for sanitary waste (SMUD 2001a, p. 8.13-8). To reduce the CPP's use of fresh inland water, the project is proposing to employ the use of zero liquid discharge (ZLD) technology as part of the project. The ZLD is designed to process all plant wastewater, returning a relatively high quality distillate stream for reuse in the plant, and producing a solids waste stream suitable for proper landfill disposal. The process water would not be discharged into Clay Creek as originally proposed (SMUD 2002ac, p. ii).

Water

Water supply for existing facilities at the project is provided by an on-site treatment facility using Folsom – South Canal water as a supply source. The point of delivery of the water supply is through a turnout from the canal located at a point on the canal approximately 700 feet upstream from the inlet transition of the Laguna Creek siphon. The water is pumped west through a 66-inch diameter pipeline to the Rancho Seco Nuclear Plant and water for the proposed project would be diverted to a 12-inch diameter pipe to the proposed project site (SMUD 2001a, p. 7-2).

Fire Protection

The issue of fire protection is addressed in the **Worker Safety and Fire Protection** section of this PSA.

IMPACTS

POPULATION

Construction

For the purposes of defining the affected socioeconomics study area of the proposed project, staff has assumed that most, if not all, construction workers would be willing to make a 1 to 2 hour commute to the proposed project site. Staff reviewed the socioeconomics data for counties within that commute range, which includes Sacramento, Placer, El Dorado, San Joaquin, Amador, Calaveras, Solano, and Yolo counties.

Construction of Phase 1 and Phase 2 of the proposed project would be completed in two phases, 24 months and 18 months, respectively. **Socioeconomics Table 9** summarizes the total number of construction workers required for both phases of project construction. The employment estimates used in **Socioeconomics Table 9** were derived from the AFC, with the calculations verified by staff. While the project would require a peak number of 381 workers in month 12 and 9 of Phase 1 and 2, respectively (SMUD 2001a, Tables 8.8-12 and 8.8-13,), the peak month for each worker-trade category differs from category to category. For example, the most sheetmetal workers would be employed in month 12 of Phase 1, while the greatest number of insulation workers would be employed between months 18-21. To view the total construction force by month and by task, please refer to the AFC. The following table lists the peak

number of workers by worker-trade category that would be onsite for their respective peak month(s).

Socioeconomics Table 10 identifies historic and projected future availability of specific construction and operations trade workers for the combined Sacramento and San Joaquin county region. **Socioeconomics Table 10** indicates that in the year 2004, a total of 67,210 construction workers are projected to be available within the Sacramento and San Joaquin County area. With the assumed maximum need of 389 construction workers (expected peak labor for the project), that number would represent 0.6 percent of the total projected construction workforce within the project area. Because the number of construction workers required represents such a small portion of the local available labor force, it is assumed that almost no population in-migration would occur as a result of project-related construction activities. Therefore, no significant impacts are expected as a result of construction-related population increases.

**Socioeconomics Table 9
CPP Peak Workforce Requirements**

Trade	PEAK WORKERS PER PEAK MONTH PHASE 1	PEAK WORKERS PER PEAK MONTH PHASE 2
Insulation Workers	24	24
Boilermakers	42	42
Masons	3	3
Carpenters	14	14
Electricians	65	65
Ironworkers	30	30
Laborers	15	15
Millwrights	24	24
Operating Engineers	12	12
Painters	4	4
Pipefitters	86	86
Sheetmetal Workers	8	8
Surveyors	2	2
Teamsters (Site)	5	5
Surveyors	4	2
Foremen	4	4
Equipment Operators	18	18
Laborers	25	25
Teamsters (Linear)	4	4
TOTAL	389	387
SMUD 2001a, Tables 8.8-12 and 8.8-13.		

Operation

According to the AFC, it is estimated that 20 permanent employees will be required for operations of the proposed facility. SMUD anticipates that all 20 permanent employees will be hired from the existing local labor force, resulting in no operational employees coming from outside the local labor force (SMUD 2001a, p. 8.8-15). With year 2000's population of 1,787,097 in the Sacramento and San Joaquin County areas, any potential permanent employees drawn from outside the region would result in a negligible increase to the total population. Therefore, any potential population in-migration impacts resulting from the operational workforce would be insignificant.

Socioeconomics Table 10
Historic and Projected Future Employment for the Combined Sacramento and San Joaquin County Region, 1997 and 2004

Trade	1997	2004
Carpenters	4,210	5,100
Masons	1,660	1,960
Painters	1,470	1,790
Metal Workers	2,310	2,690
Electricians	2,600	3,160
Welders	1,310	1,570
Excavating	370	490
Grading	350	450
Truck Operators	2,590	3,060
Operating Engineers	600	700
Laborers	24,890	29,950
Plumbers	1,680	1,910
Administrative Staff	2,410	2,810
Mechanical Engineers	530	760
Electrical Engineers	1,880	2,560
Engineering General	6,380	7,500
All Other	630	750
TOTAL	55,870	67,210
Source: Data from the State of California, Employment Development Department, Labor Market Information, Table 6, Occupational Employment Projections 1997-2004. Total workers calculated from the 1995 EDD estimated workforce for the counties. (EDD, 2001b). Staff has assumed that Flagmen are grouped in with Laborers and the contractor or owner will supply Foremen Staff.		

Housing

The proposed project site for the CPP would be located on approximately 30 acres of 2,480 acres owned by SMUD. The site contains no housing, and as such, no housing would be displaced as a result of the proposed project.

As presented in **Socioeconomics Table 5**, there were 658,239 total housing units within Sacramento and San Joaquin counties with 38,045 vacant units, resulting in a 5.8 percent vacancy rate. During project construction, it is expected that most construction workers are within commuting distance of the proposed project site and therefore would not need to move into the area for the duration of construction. However, in the event that construction workers temporarily relocate to the study area during peak construction periods, an ample number of housing units are available in the study area. In addition to the available housing units, there are over 12,000 motels and hotels within commuting distance of the proposed project site (SMUD 2001a, p. 8.8-14). Therefore, no construction-related impacts are expected on the local housing supply.

During the proposed project operations, only 20 full-time employees would be required to operate the plant, with all projected to come from within the Sacramento and San Joaquin County area. As a result, the proposed project operations would not significantly impact current housing availability.

Employment and Economy

Based on data provided in **Socioeconomics Table 9**, during peak employment months, a maximum of 389 construction workers are projected to be employed. According to the AFC, the estimated construction payroll for both phases of the proposed project would be \$60 million. Along with the construction payroll, it is expected that between \$16 and \$20 million would be spent within the Sacramento and San Joaquin County economies on material and supplies over 2 years (SMUD 2001a,

p. 8.8-14). In addition, construction activity would result in secondary economic impacts (i.e., indirect and induced employment due to the purchase of goods and services by firms involved with construction, and induced employment due to construction workers spending their income within the counties). The estimated indirect and induced employment within the two-county region would be 38 and 555 jobs, respectively. These additional jobs result from \$5.6 million in local construction expenditures as well as \$42 million in spending by local construction workers (SMUD 2001a, p. 8.8-14). The influx of wages would result in a positive fiscal and economic impact on the local area. During operation, the proposed project is expected to employ approximately 20 people in full-time, onsite positions, which would generate an annual operation payroll of \$1.25 million, resulting in a permanent increase in tax revenues and local and regional spending by the operations staff for the life of the project. Annual expenditures from CPP for supplies and materials are estimated to be approximately \$8-10 million, of which approximately \$5 million is anticipated to be spent locally (SMUD 2001a, p. 8.8-16). These expenditures are expected to help generate additional jobs within the area, and additional spending. The operation of the proposed project would result in the creation of 25 indirect and 18 induced permanent jobs that would occur within the two-county region. The indirect and induced impacts from the additional 43 jobs would result from annual expenditures on payroll of \$1.25 million, as well as operations and maintenance budget of \$5 million (SMUD 2001a, p. 8.8-16). Based on independent analysis of this data, staff agrees with the AFC's finding that the proposed CPP's operation would result in a positive fiscal and economic impact on the local area. As shown in **Socioeconomics Table 4**, the recent unemployment rate within San Joaquin County is relatively high at 8.8 percent. According to the California Employment Development Department (EDD, 2002), the 2002 unemployment rate in California was 6.7 percent. To maximize the proposed project's employment opportunities within the project area, staff recommends **Condition of Certification SOCIO-1** to ensure local economic and employment benefits from the proposed project. No adverse employment impacts would occur.

FISCAL

The initial capital cost of both phases of the CPP is estimated to be \$595 million. The estimated value of materials and supplies that will be purchased locally during construction is \$16-20 million. The local sales tax expected to be generated during construction is \$1.2-1.5 million. Of that amount in expected sales tax receipts, the state will receive 5.75 percent or \$920,000 to \$1.15 million; the county would receive 1.25 percent or \$200,000-250,000 (SMUD 2001a, p. 8.8-15). The sales tax revenue realized during construction would have a positive benefit to Sacramento County.

The estimated construction payroll for the proposed project is estimated to be \$60 million (SMUD 2001a, p. 8.8-14). The proposed project is expected to employ approximately 20 people in full-time, onsite positions, resulting in an estimated annual operation payroll of \$1.25 million (SMUD 2001a, p. 8.8-16). Revenues from the sale of power will be distributed to Sacramento County for purposes of debt service, and to cover operating expenses.

The annual operations and maintenance budget is expected to be \$8-10 million, with approximately \$5 million estimated to be spent locally (SMUD 2001a, p. 8.8-16). Based

on these assumptions, estimated annual sales taxes will be approximately \$375,000. Of this amount, the place of sale (assumed to be Sacramento County) will receive \$63,000 in sales tax revenue (SMUD 2001a, p. 8.8-17). Based on the fiscal resource data for Sacramento County and that was presented in **Socioeconomics Table 7**, the influx of additional fiscal revenue from CPP would help balance their revenue and expenditure budgets. Based on independent analysis of this data, staff agrees with the AFC's finding that the anticipated increase in sales tax revenue from the operation of the CPP would be beneficial but not significant because it would constitute such a small percent of total revenues for Sacramento County.

Since SMUD is a municipal entity, it does not pay property taxes, so Sacramento County would not derive any additional funds from property taxes.

PUBLIC SERVICES

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increase the demand for a particular service leading to the need for expanded or new facilities. An increase in population in any given area may result in the need to develop new, or alter existing, government facilities in order to accommodate increased demand. As an electric generation project seeking to meet the current and future demand of customers, the proposed project is not expected to result in a significant increase in the population of the area (as described above).

Police Protection

Because the proposed CPP project would not induce any substantial population, and is located within land currently owned by SMUD, it is estimated that the proposed plant would not represent a significant increase in patrolling responsibilities of the Sacramento County Sheriff's Department since they already monitor the existing Rancho Seco Power Plant within the project area. While the project would result in new site structures, the estimated emergency response time to the site is not estimated to be compromised. No impact to police protection practices would occur.

Schools

A sufficient labor pool exists within the study area and it is anticipated that construction and operations workers would commute to the project site rather than relocate. No project-induced population increase is expected. Therefore, no impacts to schools are expected from the project.

Other Public Services

The proposed project would not directly or indirectly induce substantial population growth in the area. Any short-term increase in population due to construction activities is considered to be minimal, with adequate numbers of construction workers currently residing within commuting distance to the project area. Therefore, no further constraints would be placed on any current public service providers as a result of the proposed project. No adverse physical impacts associated with the provision of public facilities (new or altered) would occur.

CUMULATIVE IMPACTS

Cumulative socioeconomic impacts were assessed by researching other large-scale construction projects in the study area, where overlapping construction schedules could create a demand for workers that could not be met by labor in the study area. Due to the large size of the study area and the large labor pool, staff assumed that only construction projects located near the proposed project site would need to be considered.

There is an Application for Certification (AFC) before the Energy Commission for a nominal 900-megawatt power plant called the Roseville Energy Facility (01-AFC-14). The proposed site is approximately five miles northwest of downtown Roseville, and approximately 30 miles from the proposed CPP site. If the Roseville plant is approved, the applicant plans to complete construction of the power plant over a period of approximately twenty-four months. Given the distance of the proposed Roseville Energy Center from the proposed CPP, and the uncertainty of the exact construction dates of both projects, staff is unable to determine if there would be any schedule overlaps between the two projects. However, with the available large labor force within commuting distance of both projects, overlapping construction schedules are not expected to result in any significant cumulative socioeconomic impacts. There are no other known major construction projects in the vicinity of the project site or along the associated proposed pipelines.

Staff has concluded no significant socioeconomic impacts would occur from the cumulative actions of CPP and other potential projects. Due to the large number of available workers within the study area (approximately 67,210 construction workers projected to be available in 2004 within the Sacramento and San Joaquin County area), it is very unlikely that a significant number of construction or operations workers would relocate to the study area. Even if some workers did relocate to the study area, there would be adequate available housing units to accommodate them. Therefore, due to an available large labor pool of construction workers, the cumulative demand for workers resulting from cumulative projects in combination with the CPP can be met without causing a significant influx of workers from outside the study area. No significant cumulative socioeconomic impacts would occur.

ENVIRONMENTAL JUSTICE

The purpose of the environmental justice screening analysis is to determine whether there exists a low-income and/or minority population within the potential affected area of the proposed site. Staff conducted the screening analysis in accordance with the “Final Guidance for Incorporating Environmental Justice Concerns” contained in EPA’s NEPA Compliance Analysis (Guidance Document) dated April 1998. Minority populations, as defined by this Guidance Document, are identified where either:

- The minority population of the affected area is greater than fifty percent of the affected area’s general population; or

- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Energy Commission staff has determined the potential affected area as a six-mile radius of the proposed CPP site. The six-mile radius is consistent with the radius used for staff's cumulative air quality analysis. In addition, there may be one or more census blocks or "pockets" that have a minority or low-income population greater than 50 percent. When a minority and/or low-income population is identified per the above, staff in the technical areas of air quality, public health, hazardous materials, noise, water, waste, traffic and transportation, visual resources, land use, socioeconomics and transmission line safety and nuisance consider possible impacts on the minority/low-income population as part of their analysis. This "environmental justice" (EJ) analysis consists of identification of significant impacts (if any), identification of mitigation, and determination of whether there is a disproportionate impact if an unmitigated significant impact has been identified. Staff's environmental justice approach includes providing notice (in appropriate languages) of the proposed project and opportunities for participation in public workshops to minority and/or low-income communities, and providing information on staff's environmental justice approach to minority and/or low-income persons who attend staff's public workshops.

The total minority population within a six-mile radius of the proposed project site is 16.5 percent (refer to **Socioeconomics Figure 1**), far below the EPA threshold of 50 percent. However, as indicated in **Socioeconomics Figure 1**, some census blocks within the six-mile radius located within The County of Sacramento have a total minority population above 50 percent; staff considers these to be pockets or clusters. Four census blocks in particular have 100 percent minority populations. However, these blocks have total populations of nine, seven, five, and three, respectively. Therefore, although these clusters of minority populations are greater than fifty percent within the six-mile radius, these clusters have very low population densities.

In addition, while low-income statistics are not currently available for 2000, as shown in **Socioeconomics Figure 2**, the 1990 data show that 7.6 percent of residents within the six-mile radius of the proposed project site were living under low-income conditions. Assuming that low-income levels have increased proportionate to total population, the percentage of residents currently living under low-income conditions within the six-mile radius of the proposed project site is not expected to exceed 50 percent.

Because staff has determined there to be pockets or clusters of minority population within the six-mile radius, staff has conducted a focused environmental justice analysis for socioeconomics. However, based on the socioeconomics analysis, staff has not identified any significant adverse direct or cumulative socioeconomics impacts resulting from the construction or operation of the project. Therefore, there are no environmental justice issues related to socioeconomics for this project.

It should be noted that in accordance with E.O. 12898 on Environmental Justice, the Energy Commission has kept the public informed of the project through flyers, mailers, notices in newspapers, and public workshops. **Socioeconomics Table 11** provides a

list of public involvement opportunities that have occurred since the start of the CEC's review of the project.

Socioeconomics Table 11
Public Outreach and Involvement Opportunities Sponsored by the
California Energy Commission for the CPP

Meeting or Event	Date
4,700 Bilingual Project Description Flyers sent to Galt Joint Union Elementary School District for Distribution	October, 2001
AFC, Project Description Posters, and 25 Project Description Flyers sent to the Galt Neighborhood Library	October 18, 2001
AFC, Project Description Posters, and 25 Project Description Flyers sent to the Elk Grove Library	October 18, 2001
5,500 Project Description Flyers sent to Galt Chamber of Commerce for Distribution	October 21, 2001
16,000 Project Description Flyers sent to Galt Herald Newspaper for Distribution with Newspapers	December 6, 2001
Public Informational Hearing and Site Visit	December 19, 2001
Site Visit and Data Response Workshop	January 23, 2002
Hearing on Project Status	May 14, 2002
Issue Resolution Workshop	May 15, 2002
Data Response and Issue Resolution Workshop	June 11-12, 18, and 25, 2002

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No specific laws, ordinances, regulations, or standards apply to socioeconomic impacts. California State Planning Law (Government Code Sections 65302 et seq.) requires that each city and county adopt a General Plan consisting of seven mandatory elements to guide planning and development within the jurisdiction. Most jurisdictions do not have laws, ordinances, or regulations specifically affecting the socioeconomic aspects of a project.

FACILITY CLOSURE

Should the plant be permanently closed, the beneficial socioeconomic impacts such as worker payroll, project expenditures and local economic stimulus would no longer occur. The planned lifetime of the proposed power plant is 30 years; however, given unforeseen circumstances the plant may be retired prematurely for a variety of reasons. This could include the determination that the plant is no longer economically viable. Should the plant be temporarily shutdown or closed, there would not be any significant socioeconomic impacts. In the event that the decision is made to permanently close the facility, SMUD will develop a plan for decommissioning that will be submitted to the Energy Commission for approval.

MITIGATION

Energy Commission staff has identified economic and fiscal benefits to the project area such as employment, project expenditures, and sales tax revenues. To ensure that the local area benefits from the project, staff is proposing a condition of certification that will lead to local employment and project-related expenditures. See Condition of Certification **SOCIO-1**.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff believes that CPP would not cause a significant adverse direct or cumulative impact on housing, employment, public finance, or public services. The project would have a benefit to the area and the local project vicinity in terms of an increase in local jobs and commercial activity during construction and operation of the facility. The \$60 million construction payroll and up to \$20 million in local purchases of materials and supplies would also have a positive effect on the local and regional economy.

Four small clusters of minority populations within the six-mile radius of the proposed project site exceed 50 percent of the total population, thereby triggering an environmental justice analysis by several technical disciplines in this Staff Assessment. Staff has determined that the proposed project will not result in any significant adverse socioeconomic impacts on any low-income populations and/or minority populations.

No significant adverse socioeconomic impacts would occur as result of the construction or operation of CPP.

RECOMMENDATIONS

If the Energy Commission certifies the proposed project, staff recommends that it adopt the following condition of certification.

CONDITION OF CERTIFICATION

SOCIO-1 The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within the Sacramento and San Joaquin County area first, unless:

- to do so will violate federal and/or state statutes;
- the materials and/or supplies are not available;
- qualified employees for specific jobs or positions are not available; or
- there is a reasonable basis to hire someone for a specific position from outside the Sacramento and San Joaquin County area.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the Compliance Project Manager (CPM) copies of contractor, subcontractor, and vendor solicitations and guidelines stating hiring and procurement requirements and

procedures. In addition, the project owner shall notify the CPM by letter of the reasons for any planned procurement of materials or hiring outside the Sacramento and San Joaquin County area that will occur during the construction period.

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SOCIOECONOMICS FIGURE 1 – SIX-MILE RADIUS DEMOGRAPHIC DATA –
MINORITY

SOCIOECONOMICS FIGURE 2 – SIX-MILE RADIUS DEMOGRAPHIC DATA – LOW-
INCOME

TRAFFIC AND TRANSPORTATION

James Fore and Eileen Allen

INTRODUCTION

In this section staff addressed the extent to which the project may affect the transportation system within the vicinity of the Sacramento Municipal Utility District (SMUD) proposed Cosumnes Power Plant (CPP). Staff addressed a number of roadway and traffic issues including: 1) the roads and routings that are proposed to be used; 2) potential traffic related impacts associated with these routes; 3) the anticipated number of vehicle trips for the workforce and the delivery of equipment and supplies; 4) the anticipated encroachment upon public right-of-ways; 5) the frequency of trips and probable routes associated with the delivery of hazardous materials; and 6) the availability of alternative transportation methods such as rail.

This information has been used to determine if the project will have any significant traffic and transportation impacts and to assess the availability of mitigation measures that could reduce or eliminate the significance of identified impacts. Conditions of certification are included in this analysis to implement the appropriate mitigation measures, to measure the compliance and effectiveness of the mitigation measures, and to ensure that the project complies with the applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

The federal government addresses transportation of goods and materials in Title 49, Code of Federal Regulations:

- Title 49, Code of Federal Regulations, sections 171-177, governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, sections 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, addresses safety considerations for the transport of goods, materials, and substances over public highways.
- Federal Aviation Administration (FAA) regulation Title 14, Code of Federal Regulations, Part 77; a Notice of Construction would need to be filed with the FAA, if the project includes a structure that is equal to or greater than 200 feet (500 feet in an uncongested area) above the average ground level for the site. A notice would also be required if the structure protrudes above an imaginary surface extending from the end of any runway, at a slope of 50:1 for 10,000 feet if the runway length is 3,200 feet or less. If the runway is 3,200 feet or longer the structure would have to penetrate an imaginary surface extending from the end of the runway at a slope of 100:1 for a distance of 20,000 feet, approximately 3.3 miles.

STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, the transportation of hazardous materials and rights-of-way. In addition the California Health and Safety Code addresses the transportation of hazardous materials. Specifically, these codes include:

- California Vehicle Code, section 353 defines hazardous materials. California Vehicle Code, sections 31303-31309, regulates the highway transportation of hazardous materials, the routes used, and restrictions thereon;
- California Vehicle Code, sections 31600-31620, regulates the transportation of explosive materials;
- California Vehicle Code, sections 32000-32053, regulates the licensing of carriers of hazardous materials and includes noticing requirements;
- California Vehicle Code, sections 32100-32109, establishes special requirements for the transportation of inhalation hazards and poisonous gases;
- California Vehicle Code, sections 34000-34121, establishes special requirements for the transportation of flammable and combustible liquids over public roads and highways;
- California Vehicle Code, sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11, regulates the safe operation of vehicles, including those which are used for the transportation of hazardous materials;
- California Health and Safety Code, sections 25160 et seq., addresses the safe transport of hazardous materials;
- California Vehicle Code, sections 2500-2505 authorizes the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives;
- California Vehicle Code, sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, it requires the possession of certificates permitting the operation of vehicles transporting hazardous materials;
- California Streets and Highways Code, sections 117 and 660-72, and California Vehicle Code sections 35780 et seq., require permits for the transportation of oversized loads on county roads; and
- California Street and Highways Code, sections 660, 670, 1450, 1460 et seq., 1470, and 1480 regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.

LOCAL

Sacramento County

The Circulation Element of the Sacramento County General Plan and the Metropolitan Transportation Plan contain policies applicable to the CPP. The Circulation Element sets up goals and guiding policies about building transportation improvements. It introduces planning tools essential for achieving the local transportation goals and policies. The Metropolitan Transportation Plan establishes regional transportation goals, policies, objectives, and action for various modes of transportation.

Relevant circulation and implementation goals and policies in Section V of the Circulation Element of the County of Sacramento General Plan, (Sacramento County Planning Department, 1993) includes the following:

- CI-9 Sacramento County will assess fees on new development sufficient to cover the fair share portion of that development's impacts to the regional transportation system that is not covered by other funding sources.
- CI-14 Sacramento County will utilize design and development standards that support travel by transit, walking, bicycling, and clean alternatives fuel and low emission vehicles.
- CI-18 Sacramento County will develop a broad range of demand reduction measures designed to induce efficient use of existing roads, bridges, and parking facilities. Implementation measures may include congestion pricing for roads, bridge tolls, revised parking fees, and other user charges.
- CI-22 Sacramento County shall apply the following level of service (LOS) standards for planning roads in the unincorporated area: 1. Rural collectors: LOS D; 2. Urban area roads: LOS E. The county may proceed with additional capacity projects within the scope of the adopted Transportation Plan when the Board of Supervisors has determined that implementation of all feasible measures that will reduce travel demand in the affected corridor will not provide the target level of service.
- CI-23 New developments that result in levels of service for roads in unincorporated areas that are worst than a LOS D for rural collectors or a LOS E for urban area roads or the 1993 LOS, whichever is worse, will not be approved unless traffic impacts are mitigated. Such mitigation may be in the form of (1) capacity improvements to either the roadway system, the transit system, or both, or (2) demand reduction measures included in the project design, or operation, or both.
- CI-25 Sacramento County will regulate truck travel as appropriate for the transport of goods, consistent with circulation, air quality, congestion management, and land use goals.
- CI-26 Sacramento County will support the development of multimodal centers with passenger facilities for heavy rail, light rail, and bus.

CI-27 Sacramento County will integrate railroad freight services into regional transportation and economic strategies.

Yolo County

The Circulation Element of the Yolo County General Plan contains policies applicable to the CPP. The Circulation Element sets up goals and guiding policies about building transportation improvements. It introduces planning tools essential for achieving the local transportation goals and policies. Relevant goals and policies in the General Plan include the following:

- Yolo County shall require a service level of “C” for all County roads.
- Yolo County shall discourage truck traffic on residential streets and shall apply traffic controls, speed limits, and load limits on residential street truck routes where assignment to truck traffic is unavoidable.

City of Elk Grove

The City of Elk Grove now has jurisdiction over the East Franklin area that was previously unincorporated in Sacramento County. The CPP’s proposed gas pipeline route is proposed to go through the East Franklin area of Elk Grove, as well as the unincorporated area in the County. The City adopted the tenets of Sacramento County’s East Franklin Specific Plan, which include the Sacramento County General Plan’s LOS standards for rural and urban roads.

SETTING

REGIONAL DESCRIPTION

The CPP facility is proposed to be a 1,000-megawatt natural gas fired electric generating facility located south of the existing SMUD Rancho Seco facility. The CPP facility would be constructed in two phases. Phase One is anticipated to take 24 months and Phase Two 18 months. The CPP facility would occupy approximately 30 acres of SMUD’s 2,480-acre property.

The CPP site is located in the southern portion of Sacramento County, approximately 25 miles southeast of the city of Sacramento. The primary access to the site would be off of State Route 99 (SR 99) by way of Twin Cities Road (also known as State Route 104) and Clay East Road.

The project would also require the construction of a 26-mile natural gas fuel pipeline, and the installation of two compressor stations to ensure the delivery of natural gas to the project. The natural gas pipeline would originate at SMUD’s Carson Ice-Cogeneration facility located about 26 miles northwest of the project site. One of the natural gas compressor stations would be installed near the community of Winters in Yolo County, adjacent to an existing PG&E gas compressor station, which also contains a tie-in to an existing SMUD gas pipeline. The other gas compressor station would be

built at the existing SMUD gas pipeline Valve Station 190 located northwest of Elk Grove.

Freeways, Highways and Local Roadways

The primary roadways that will be affected by the construction and operation of the CPP would be State Route 99 (SR 99), Twin Cities Road (also known as SR 104) and Clay East Road, see **Project Description Figure 4**.

Freeways and Highways

SR 99 is a major north-south highway that provides access to the San Joaquin Valley and southern California; and Marysville/Yuba City to the north. It lies approximately 5.5 miles west of the site. SR 99 provides access to the local roadways that serve the plant site.

Local Roadways

The project site can be accessed from SR 99 by traveling east on SR 104/Twin Cities Road, a two-lane roadway. The California Department of Transportation has designated SR 104 as a truck route. Twin Cities Road passes north of the project site and continues east to the community of Ione.

Clay East Road is a two-lane roadway south of the plant site serving local traffic and residences in the area. Clay East Road intersects SR 104 west of the proposed facility.

The Winters natural gas compressor station would be located in an agricultural area in Yolo County north of County Road 29 (CR 29), and west of CR 89. CR 29 and CR 89 are two-lane rural roads serving local traffic and residences in the area.

The gas pipeline route would affect numerous rural roads in southern Sacramento County. The affected roads and proposed pipeline route are listed in **Traffic and Transportation Table 4** under the Linear Facilities heading in the Project Specific Impacts section.

Airports

Several airports and landing strips are located in the region. The major airports are the Sacramento International Airport, Mather Airport, and Sacramento Executive Airport. Mather Airport is located 12 miles east of Sacramento and 16 miles north of the CPP. Sacramento International Airport is located 30 miles northwest from the CPP site. Sacramento Executive Airport is located south of downtown Sacramento and approximately 24 miles northwest of the project site.

Rancho Murieta and Sunset Skyranch are two private airports that are open to general aviation. These airports are located approximately six miles north and northwest of the proposed CPP.

Railroads

Union Pacific Railroad has an active main line that borders Twin Cities Road on the north. There is an active rail spur from this rail line that enters the Rancho Seco site. The applicant intends to use this rail spur for the delivery of heavy equipment (e.g. steam turbines, combustion turbine, heat recovery steam generators). The heavy equipment would be unloaded near the Rancho Seco plant site and transferred to lowboy trailers pulled by trucks for transport to the CPP site. This equipment would be transported over internal roads within the SMUD property and through a gate to the CPP site. No access to public roadways will be required for truck movement of rail deliveries to the CPP (SMUD 2002o).

The natural gas fuel pipeline from SMUD's Carson Ice-Cogeneration facility to the CPP facility would be adjacent to the Union Pacific Railroad right-of-way for part of the natural gas pipeline route. This would be a distance of approximately six miles from the Carson Ice-Cogeneration facility to Core Road. The advantage of following the railroad right-of way is that with the exception of a few intersection crosses, it greatly reduces roadway construction activity.

Public Transportation

There are no public transportation routes or facilities (e.g. Regional Transit bus, or light rail lines, and/or stops in the vicinity of the project or the linear features. No public transportation routes or facilities would be affected by the project.

Bicycle Facilities

The Circulation Element of the County of Sacramento General Plan does not indicate any bicycle routes in the vicinity of the proposed CPP or along the natural gas fuel pipeline route.

PLANNED ROADWAY AND TRANSIT IMPROVEMENTS

The regional transportation system in the area of the CPP site has several long-range improvements planned. These improvements include:

State Route 99 – Caltrans plans to construct a new maintenance facility near Elk Grove. Staff will work with Caltrans to determine the location and timing of this project, and the implications, if any, for CPP construction traffic.

SR 104/Twin Cities Road – Caltrans has long term plans (i.e., in 2015) to widen the Twin Cities Road overpass from two lanes to four lanes at SR-99, and to add a bicycle lane that would fit into an existing wide section of SR 104/Twin Cities. This long-term project would not be affected by the CPP schedule.

CURRENT ROADWAY OPERATING CONDITONS

TRAFFIC PROFILE

In assessing the impact that a project will have on the local roadway system, level of service (LOS) measurements are used. LOS is a tool used to describe the operating characteristics of the roadway system in terms of the level of congestion or delay experienced by traffic. When evaluating the potential impact of a project on the local traffic and transportation system, staff uses LOS measurements as the foundation on which to base the analysis. LOS measurements represent the flow of traffic. LOS will range from A, free flowing to F, which represents heavy congestion and stoppage of traffic flow. LOS can be determined through two related measurements: intersection capacity utilization and roadway segment vehicle to capacity (V/C) ratios. **Traffic and Transportation Table 1, Level of Service Classifications**, provides a description of the traffic flow conditions associated with the LOS classifications.

**Traffic and Transportation Table 1
Level of Service Classifications**

Level of Service	Type of Flow	Delay	Maneuver Ability	V/C Ratio
A	Stable Flow	Very slight or no delay	Turning movements are easily made, and nearly all drivers find freedom of operation	0.00-0.60
B	Stable Flow	Slight Delay	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles	0.61-0.70
C	Stable Flow	Acceptable delays	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	0.71-0.80
D	Approaching Unstable Flow	Tolerable delay	Maneuverability is severely limited during short periods due to temporary back-ups.	0.81-0.90
E	Unstable Flow	Intolerable delay	There are typically long queues of vehicles waiting upstream of the intersection.	0.91-1.00
F	Forced Flow	Excessive delay	Jammed conditions. Back ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions	Greater than 1.00

Source: HCM, 1994

Staff prefers to use both measurements but in many cases only one of the two types of data is available. Because of the rural location of this project and the lack of intersection data, staff has used the LOS classifications based on the amount of traffic and roadway capacity. The LOS for the various roadways was derived by dividing peak hour traffic volumes by roadway capacity (V/C ratio).

Traffic and Transportation Table 2 Local Roadway Characteristics, summarizes the annual average daily traffic (AADT), the annual average peak hour traffic, annual average daily truck traffic, and the current LOS in the vicinity of the CPP. The AADT is the total traffic volume for the year divided by 365 days. Peak hour traffic volume is a

useful indicator to show how near to capacity the roadway is operating. Traffic flow on SR 99 at SR 104/Twin Cities Road is operating at LOS of C. The table indicates that the two local roadways, SR 104/Twin Cities and Clay East roads, are operating at a LOS of A.

**Traffic and Transportation Table 2
Local Roadway Characteristics**

Highway/ Milepost	Location	Annual Average Daily Traffic (a)	Annual Average Peak hour Traffic (a)	Annual Average Daily Truck Traffic (b)	Percent Truck Traffic	LOS
State Route 99						
3.53	SR 104/Twin Cities, Jct. Route 104 East	55,000	4,700	8,820	18	C
State Route 104						
0	Twin Cities, Jct. Route 99	8,000	860	520	8	A
9.22	Clay East Road	3,800	460	N/A	N/A	A

Source: SMUD 2001a, Table 8.10-3, page 4.10-7.

(a) Caltrans 2000

(b) Caltrans 1998

N/A not available

AADT and LOS data was not readily available for the local roads that would be affected by the CPP pipeline and compressor stations. Staff field observations of these rural roads indicated that the traffic volumes appeared to be very low with no congestion. All roadways are narrow with little or no shoulder.

ANALYSIS AND IMPACTS

THRESHOLDS OF SIGNIFICANCE

In order to determine whether there is a potentially significant impact staff reviews the project in light of the following criteria found in Appendix G of the California Environmental Quality Act (CEQA); Title 14, California Code of Regulations, Section 15000 et seq:

- Traffic levels, particularly any increases which are substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).
- Level of service standards established for roads and highways.
- Hazards due to a design feature (e.g., sharp curves or dangerous intersections).
- Emergency access.
- Parking capacity.

In the Construction Impacts section of this analysis, staff discusses the above items found in the traffic section of Appendix G. Although not an Appendix G item, staff also discusses the potential traffic and transportation impacts of oversize and overweight loads in the Construction Impacts section. Emergency access and parking capacity are discussed primarily in the Construction Impacts section, since potential impacts in those areas are most applicable to the Construction phases. Hazards to the public or the environment through the routine transportation of hazardous material, and changes to air traffic patterns are discussed in the Operations section since potential impacts in those areas more commonly occur when the generating facility is operating.

PROJECT SPECIFIC IMPACTS

CONSTRUCTION IMPACTS

Construction Workforce and Truck Traffic

This section discusses the potential for increased traffic associated with construction of each feature of the CPP project.

PLANT SITE

Construction Workforce

Construction of the first phase of the CPP is expected to take 24 months, while the second phase would take 18 months. SMUD construction plans call for a two to three month or longer idle period between the two phases.

The project would require an average workforce at the site of 159 workers per month over the 24 months to construct Phase 1. During Phase 1's peak construction month (Month 12) the workforce would reach an estimated 328 workers at the plant site.

The Phase 2 workforce would average 196 workers, compared with 159 for Phase 1, because of the shorter construction time of 18 months. (SMUD 2001a, Table 8.8-13, pages 8.8 –12 and 8.8-13. The peak workforce would be 328 workers.

The traffic analysis assumes a worst-case scenario in which each construction worker drives a separate vehicle to the project site and arrives during the peak traffic hour. Each worker would make two trips per day (one round trip from home to the site and back). Assuming the average of 196 workers this would result in the construction workforce generating approximately 392 (i.e., two times 196) vehicle trips per day on average and 656 (i.e., two times 328) vehicle trips per day during the peak construction period, as shown in **Traffic and Transportation Table 3** below.

Construction Truck Traffic

In addition to the workforce traffic, truck traffic would be generated by CPP construction through the delivery of equipment and construction material such as concrete, wire, pipe, cable, and steel. Deliveries would also include hazardous materials to be used during construction such as gasoline, diesel fuel, oil, and lubricants. Safeguards for

delivery of hazardous materials are discussed under the Transportation of Hazardous Materials heading later in this section.

Truck deliveries would average 10 round trips per day with the peak being 20 round trips per day. Truck deliveries were assumed to occur during the normal construction hours for the workforce between 7:00 a.m. and 3:30 p.m. Monday through Friday. To evaluate the worst case scenario it was assumed that the delivery trucks would arrive and depart during peak traffic hours, as shown below in **Traffic and Transportation Table 3**.

**Traffic and Transportation Table 3
Summary of Construction Trips Generated**

Traffic Source	Vehicle Daily One Way Trips		Vehicle Daily Round Trips		PCE* Daily One Way Trips		PCE Peak Hour	
	Average	Peak	Average	Peak	Average	Peak	Average	Peak
Workforce	196	328	392	656	392	656	196	328
Construction Trucks	10	20	40	80	80	160	40	80
Total	206	408	432	736	472	816	236	408

* PCE - Passenger Car Equivalent. Truck traffic is converted to an equivalent traffic flow for cars, with one truck considered equivalent to four passenger cars, in order to determine the total construction traffic impact on the roadways and related LOS. Source: Calculated from the AFC estimate of the construction workforce and truck deliveries, (SMUD 2001a, Section 8.10.4.2, Page 8-10.10).

Level of Service

Workforce Travel Route

The workforce for this project is expected to come from the greater Sacramento area and San Joaquin County. This traffic route would most likely be north and south on SR 99 from the Sacramento area and San Joaquin County. This traffic would exit on to Twin Cities Road. Traffic would then travel east on Twin Cities Road to the intersection of Twin Cities Road and the entrance to the Rancho Seco Park. This park is part of the Rancho Seco facility.

Traffic would then turn at the entrance to the Rancho Seco Park and proceed on the road for a short distance. SMUD is to construct an access road that would go south and intersect with Clay East Road. At Clay East Road traffic would turn west and travel approximately one-half mile to the CPP access road.

The workforce would then enter the CPP site by way of the constructed access road off of Clay East Road to a designated parking area. The CPP would provide on site parking for the workforce and all related traffic.

Construction traffic would travel on Twin Cities Road and the eastern portion of Clay East Road. These roadways are presently operating at a LOS of A. The effects of construction traffic using Twin Cities Road and the east portion of Clay East Road will not be significant. The LOS for these roadways would still be maintained at acceptable

LOS of A and B, as shown in **Traffic and Transportation Table 4 Peak Hour Level of Service**.

**Traffic and Transportation Table 4
Peak Hour Level of Service**

Roadway Location	Peak Hour Capacity	Annual Average Peak Hour Traffic	V/C* (LOS)	Construction Traffic		Construction and Local Traffic	
				Average	Peak	V/C (LOS)	V/C (LOS)
SR-99/Twin Cities Road	2,100	860	0.41 (A)	236	408	0.52 (A)	0.61 (B)
Twin Cities Road/ Clay East Road	2,000	460	0.23 (A)	236	408	0.35 (A)	0.43 (A)

*V/C Volume / Capacity

Although the increase in construction traffic would not significantly affect the LOS for the local roadways and is therefore not seen as a significant impact on traffic, staff has proposed mitigation measures and conditions of certification to ensure that project related traffic affects are minimized.

Linear Facilities

Staff's impact analysis of the entire project includes all of the linear facilities. The route for the gas pipeline route is described in detail in the Gas Pipeline section below. The routes for the other linear facilities (i.e., a transmission line and a plant access road) have not been included in this Linear Facilities section, because they are very short, and would be within the confines of the SMUD property.

Gas Pipeline

CPP Phase 1 requires construction of a 26-mile gas fuel pipeline. The pipeline would require approximately seven months to construct. The workforce would average 50 with a peak workforce of 55 during the second and fourth month. This workforce would be traveling to designated locations along the pipeline route where they will park and then be transported to the work site, (SMUD 2001a., Section 6.4, Page 6-4). Because of the small workforce associated with the pipeline construction and the fact that they would not be parking in the roadways along the route, there would not be a significant effect on traffic. **Traffic and Transportation Table 5** below lists the proposed route segments, while **Project Description Figure 4** provides a graphic depiction.

The natural gas fuel pipeline construction activity would consist of normal trenching operations and the use of directional drilling for water crossings, the crossing of freeways, state highways, and railroad crossings. Where possible, the pipeline route would use existing public right-of-way (road easement), railroad right-of-way and other utility easements. When it is necessary for the pipeline to cross land used for agriculture, public utilities, and a nature preserve, easements will be obtained.

From the Carson Ice Cogeneration facility north of Elk Grove, the pipeline will travel south along the railroad right-of-way. This portion of the route is through the only major residential area, Laguna West. Use of the railroad right-of-way in this area allows construction activity to occur out of the local roadway system, and it greatly reduces the

number of roadway intersections along the route. The two major roadways along this portion of the route are Elk Grove Boulevard and Laguna Boulevard. These roadways were built with overpasses over the railroad tracks. This portion of the route takes the pipeline approximately six miles south of the Carson Ice Cogeneration facility before it turns east toward the CPP.

This places the remaining construction activity in more rural areas with light traffic.

When roadways would be affected by pipeline construction, the CPP would be required to ensure that the construction contractors obtain all of the necessary roadway encroachment permits. Therefore, staff has proposed condition of certification **TRANS-2**. This condition would require the applicant to ensure that the construction contractors follow all traffic safety requirements for working in the roadways and that all highway, road, railroad and waterway crossings are installed in compliance with encroachment permitting requirements. This can be accomplished by working with the Cities of Sacramento and Elk Grove, Sacramento and Yolo Counties, and Caltrans.

When possible, the pipeline would be installed out of the roadway in a separate right-of-way. If this were not possible the pipeline would be placed in the roadway which could have an impact on traffic. Condition of Certification **TRANS-5** requires SMUD to develop a traffic control plan (TCP) to ensure minimal disruption to traffic and allow for its safe passage through the construction zone. If SMUD follows the traffic control measures suggested in the Manual of Traffic Controls for Construction and Maintenance Work Zones (Caltrans 1998) it should be able to mitigate the construction impact on traffic so that it would not be significant.

The TCP would cover such things as lane closures, construction lay down areas, workforce parking, detours, maintaining access over both public and private roads, and to business and residents during construction, flag person if required, etc.

The location of the pipeline route along rural roads with low traffic volume and across agricultural land should allow the applicant to develop a TCP that would reduce the impact of pipeline construction on local traffic such that it is insignificant.

Transmission System

The CPP facility would be connected to SMUD's switchyard at the Rancho Seco plant. This switchyard is located approximately 0.4 mile north of the proposed CPP site. The connecting transmission line would be on SMUD property and would not cross any public roadway. Therefore construction activity associated with the transmission line would have no significant affect on traffic.

Plant Access Road

The applicant has proposed that construction workers and equipment access the CPP site by traveling east along Twin Cities Road, and then by turning south into the joint entrance of the Rancho Seco Park (RSP) and the Rancho Seco Plant. The workers would then follow the road to RSP for a short distance. Once past the Park's gates, the workers would turn south and follow a new access road that would be built from the gate-house going south to Clay East Road. This new road would be designed to handle the oversize and overweight loads needed for construction of the CPP. At the intersection of the access road with Clay East Road, traffic would then travel west on

Clay East Road to the plant entrance road. Since this section of Clay East Road comes to a dead end, current traffic consists solely of residents and their visitors. This route would keep construction traffic from traveling by the residences located on Clay East Road, see staff's proposed condition of certification **TRANS-9**.

Traffic and Transportation Table 5 CPP Proposed Natural Gas Pipeline Route	
(a)	From the Carson Ice-Cogeneration facility the pipeline route will follow the tracks of the Union Pacific Railroad south to Core Road (6.24 miles);
(b)	At Core Road the route proceeds east to the intersection of Core Road and Ed Rau Road (0.68 miles);
(c)	The route then crosses Ed Rau Road and continues east along the existing electric power line corridor for the Rancho Seco plant to a farm road between Carroll and Eschinger roads (3.5 miles);
(d)	The route turns south on the farm road to Eschinger Road (0.5 miles);
(e)	The pipeline then proceeds east along Eschinger Road until Eschinger Road turn north (0.5 miles);
(f)	The pipeline then turns south on the north side of an unimproved farm road to the intersection with another unimproved farm road that turns in a south southeast direction before turning in an easterly direction to the Cosumnes River (2.5 miles);
(g)	After crossing under the Cosumnes River the pipeline enters the Cosumnes River Preserve where it continues in a southeast direction. The route intercepts an unimproved maintenance road that parallels electric power lines. It follows the power line maintenance road east to the Union Pacific Railroad tracks (0.9 miles);
(h)	The route then runs parallel to the railroad tracks until it connects with a road south of Badger Creek and east of the railroad tracks. After the pipeline crosses the railroad tracks, the route follows the maintenance road southeast and crosses SR 99 where it intersects Arno Road (1.1 miles);
(i)	The route then follows Arno Road. When Arno Road turns north the route continues east on Valensin Road crossing Colony Road to Alta Mesa Road. At Alta Mesa Road, it continues east until it reaches an unimproved extension of Laguna Road. The pipeline then follows the unimproved extension of Laguna Road to Twin Cities Road (6.2 miles);
(j)	The pipeline then continues east, north of Twin Cities Road to the Clay East Road/Twin Cities Road intersection (2.4 miles); and
(k)	At the Clay East Road/Twin Cities Road intersection the pipeline proceeds east along Clay East Road to the CPP site (2.2 miles).

Construction traffic leaving the plant site would turn east on Clay East Road proceeding to the new plant access road. The traffic would then take this road north to the SR 104/Twin Cities Road. During construction SMUD would require that all contractors use this route. If needed, this requirement would be enforced by having a flagman at the intersection of Clay East Road and the plant entrance road.

Water Supply

The facility would not require a new off site water pipeline.

Compressor Stations

To ensure that a sufficient supply of natural gas fuel is available for Phase II, SMUD would install one natural gas compressor station in western Yolo County, and another in southern Sacramento County. Since the construction activity for the two compressor stations would not be at the CPP site this workforce would not have a traffic impact on SR 104/Twin Cities or Clay East roads.

Yolo County Site

Construction of the proposed gas compressor station in Yolo County would be at the existing SMUD and Pacific Gas & Electric (PG&E) facility. After site preparation and foundations are set the installation of a compressor at the Yolo County site is expected to take less than two weeks (SMUD 2002p, Section 2.10., Page 2-16).

The expected construction route travel route to this location would be Interstate 505 to County Road 29A (CR 29A) exit. Construction traffic would then travel west on CR 29A to County Road 89 (CR 89). Traffic would then go north on CR 89 to County Road 29 (CR 29). Construction traffic would then take CR 29 west to the compressor site. CR 29 borders the south side of the compressor station.

The construction work should not require construction activity in the local roadways. But construction activity could result in truck traffic temporary blocking traffic in the westbound lane. If this should occur, SMUD would need to consult with Yolo County and prepare a traffic control plan, see staff's proposed condition of certification **TRANS-5**. Because of the light traffic conditions and short duration of construction activity at this location, the effect on local traffic would not be significant.

Sacramento County Site

The second compressor would be located adjacent to SMUD's existing Valve Number 190 located north of the Carson Ice-Cogeneration facility on Sacramento Regional Wastewater Treatment Plant buffer land. This location can be accessed from Franklin Road by way of a private access road. In this area, Franklin Road is a four-lane divided road. The construction activity will not take place in any of the area roadways and would take approximately two weeks. Therefore, the effects on traffic would be insignificant.

Hazard Due to a Design Feature or Incompatible Use (e.g., School Buses)

The CPP's level of construction traffic has raised safety concerns for school buses that operate along SR 104/Twin Cities Road and Clay East Road. Both of these rural roads are relatively narrow, with minimal shoulders. Construction traffic traveling on these roads presents a potential impact and safety hazard for children waiting for a school bus, and when children are getting on and off buses.

The school hours for the Arcohe Union School District are 8:10 a.m. and 2:45 p.m. The school buses for this district, leave the transit area at 6:45 a.m. with student pick-up starting after 7:00 a.m. The school buses pick students up at the school between 2:50 and 2:55 p.m. and are back to the school transit area between 3:55 and 4:10 p.m. (AUESD 2002a).

The major portion of the construction workforce traffic would be scheduled to arrive at the plant site between 5:30 a.m. and 7:00 a.m. and leave between 3:30 p.m. and 5:30 p.m. (SMUD 2001a, page 8.10-11). To mitigate any possible traffic safety concerns about construction traffic affecting safety for the school buses, staff has proposed condition of certification **TRANS-7**. This condition would require construction workforce

scheduling to avoid having the workers' shifts starting and ending during the school bus route times.

Emergency Access

The applicant's traffic control plan would address emergency access to the plant site during construction and operation. Proposed condition of certification **TRANS-5** would ensure that an acceptable plan has been submitted prior to the start of any construction activities.

Depending on the type of incident, emergency service could come from the Herald Fire Department, the City of Elk Grove, or the City of Sacramento. The Herald Fire Department has an estimated response time of 10 minutes (SMUD 2001a., Section 8.7.4.5., page 8.7-21). The nearest hospitals to the project site are Kaiser Permanente and Methodist Hospital in south Sacramento and Lodi Memorial Hospital in Lodi.

Emergency vehicles from the Sacramento or Lodi area would likely travel on I-5 or SR-99 to reach Twin Cities and Clay East roads. Construction activity would not impair traffic on these roadways, since Condition of Certification **TRANS-5** would require the workforce to travel at off-peak times. I-5 and SR-99 often have significant congestion during the morning and late afternoon commute hours, which could affect emergency access to the CPP site. Staff observations are that the worst congestion on these freeways occurs north of Mack Road on SR-99 and Meadowview Road on I-5, whereas traffic flow is adequate with an LOS of C in the vicinity of SR 104/Twin Cities Road.

Parking and Laydown Area

The project would have a combined parking and laydown area for equipment and supplies located directly south of the site on Clay East Road. This 20-acre area would provide adequate parking for the construction workforce, which has a worst case estimate of 328 workers and vehicles. There would be no parking along the roadways by construction workers or trucks delivering materials and supplies to the site. Therefore, traffic flow would not be affected by vehicles parking along the roadways.

Traffic to the laydown area would use the same route designated for the construction workforce off of Twin Cities Road. Condition of Certification **TRANS-9** requires that construction traffic to the laydown area would not use that portion of Clay East Road that passes the local residents. Traffic from the laydown area to the construction site must cross Clay East Road but would not affect the residential area located along the western portion of Clay East Road. The location of the laydown area would not result in a significant effect on traffic.

Oversize and Overweight loads

Transportation of equipment such as the turbines, which exceeds the roadway load and size limits, would require special permits from the County and/or Caltrans. Caltrans (Caltrans 2002a) and the Herald Fire Protection District (Stigelmayer 2001) reviewed the Traffic and Transportation section (SMUD 2001a, Section 8.10) in the CPP AFC. They were concerned that Twin Cities and Clay East roads may not be able to carry the heavy loads associated with the construction activity without being damaged.

The applicant has agreed to limit the movement of heavy equipment such that no vehicle exceeds the appropriate weight standards based on California Vehicle Code Section 35550 to 35559, (SMUD 2002b page 18). For those loads that would exceed the weight limits, the applicant has agreed to use the existing Rancho Seco rail spur to deliver these loads to the CPP site, (SMUD 2002b, page 19). Therefore, truckloads that exceed roadway standards would not be transported on Twin Cities and Clay East roads.

To ensure that the roadways are maintained, staff proposed a condition of certification to require the applicant to repair all roadway damage caused by construction activity, proposed condition of certification **TRANS-6**.

Construction Traffic Compatibility with Rancho Seco Park

The traffic associated with CPP construction would be compatible with ongoing use of the Rancho Seco Park. The park hours are 7:00 a.m. to 6:00 p.m, with a limited amount of overnight camping, (i.e., 18 recreational vehicle and 20 camp sites) permitted. The park hours would allow construction traffic to arrive at the CPP site before the park opens. Day visitors to the park would be expected to leave throughout the late afternoon. This could result in construction traffic leaving the plant site at the same time (i.e. between 3:30 and 5:30 p.m. depending on overtime work needs) as visitors are leaving the park area. To ensure traffic safety for those using the park, warning signs about construction traffic and hours should be installed as part of the traffic control plan, (see staff's proposed condition of certification **TRANS-5**) to alert local and park traffic about the construction activity. This signage should conform to Caltrans and County standards.

OPERATIONAL PHASE

PERMANENT WORKFORCE TRAFFIC

Operation of the generating plant would require a labor force of approximately 20 full-time employees when both phases of the facility are completed. Assuming that each employee would drive a separate vehicle to work and that they would make one round trip from home to work per day, operation of the plant would generate 40 vehicle trips per day. It has been assumed by staff that the majority of the permanent workforce would reside in the Sacramento area. The preferred route for employees coming from the Sacramento area would likely be south on SR-99, east of Twin Cities Road to Clay East Road, then east on Clay East Road to the plant site. The anticipated travel route would accommodate the operations related traffic without any significant traffic impact, and LOS would remain the same.

TRUCK TRAFFIC

Hazardous and non-hazardous materials as described in the AFC Hazardous Materials Handling section would be delivered by truck to the plant site on an incidental basis. The anticipated travel routes for hazardous and non-hazardous materials delivered to the Facility would be south from Sacramento on SR- 99, and then east on Twin Cities Road and Clay East Road to the plant access road. CPP indicated that all LORS would

be followed for the transportation and handling of hazardous material. To ensure that the transportation of hazardous material for the facility should result in insignificant traffic impacts staff proposes condition of certification **TRANS - 3**.

CHANGE IN AIR TRAFFIC PATTERNS

The CPP's stacks at 165 feet in height do not penetrate airspace under the FAA regulation Title 14, Code of Federal Regulations, Part 77. The site is in a rural area with agricultural activity that may employ crop-dusting, which could be affected by CPP's stacks. To ensure that the project does not create an air hazard to crop dusting and other aviation activity the applicant would be required to mark and light the stacks even if the FAA regulations indicates that this would be unnecessary to ensure air safety, as noted in staff's proposed condition of certification **TRANS-8**.

EMERGENCY ACCESS

The nearest fire station to the CPP is at 11620 Clay Station Road in Herald, which has an estimated response time to the site of approximately 15 minutes. The nearest hospitals to the project site are in south Sacramento (i.e., Kaiser Permanente Hospital and Methodist Hospital), Lodi Memorial Hospital, and Dameron Hospital and St. Joseph's Immediate Care in Stockton.

All roadways are currently and are expected to operate (throughout construction phase) at or above an allowable LOS, with no significant decrease expected from construction or operation of the CPP facility. Staff has concluded that the CPP would not impede or affect first responder emergency access; therefore, no impact is expected.

PARKING

Adequate parking would be made available for both the construction and operational workforce at the 30-acre plant site. To ensure that the project provides adequate onsite parking, staff proposes condition of certification **TRANS - 4**.

TRANSPORTATION OF HAZARDOUS MATERIAL

The construction and operation of the CPP would require the routine transportation of various hazardous substances. None of the chemicals proposed for use at the CPP project site are Regulated Substances subject to the requirements of the California Accidental Release Prevention Program with the exception of aqueous ammonia. CPP would use approximately 15,000 gallons per week of aqueous ammonia (29 percent solution). This would result in approximately two to three 6,000 gallon tanker truck deliveries per week. This transportation and handling of hazardous substances associated with the project can increase the potential for roadway hazards. The handling and disposal of hazardous substances are addressed in the **Waste Management Section** and the **Hazardous Materials Section** of this report. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with Federal and State standards established to regulate the transportation of hazardous substances. To ensure that the transportation of hazardous material is insignificant, staff has proposed condition of certification **TRANS - 3**.

The California Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to carry a manifest, available for inspection by the California Highway Patrol at inspection stations along major highways and interstates. Drivers are also required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

CUMULATIVE IMPACTS

The CPP site is located in a rural area of Sacramento County that does not experience heavy traffic flow. At this time there are no proposed projects that would result in additional construction traffic traveling the same routes (SMUD 2001a., Section 8.10.5., page 8.10-14). Based on the current traffic characteristics (i.e., LOS, AADT, highway capacities) of the area, traffic associated with the CPP operation of the facility would not have a significant traffic impact.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed Cosumnes Power Plant (please refer to **Socioeconomics Figure 1** in this Preliminary Staff Assessment). However, as indicated in **Socioeconomics Figure 1**, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Because staff has determined that there are pockets or clusters of minority population within the six-mile radius, staff conducted a focus environmental justice analysis for **Traffic and Transportation**.

Based on the Traffic and Transportation analysis, staff has not identified unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no Traffic and Transportation environmental justice issues related to this project.

The majority of workers and trucks traveling to the site are expected to use SR-99, Twin Cities Road and Clay East Road. This route would result in the construction traffic avoiding direct movement through any residential or commercial areas with significant traffic.

FACILITY CLOSURE

The planned operational life of the facility is 30 years. At the end of 30 years if the facility is economically viable it could continue to operate. Facility closure could be either temporary or permanent. Temporary closure would be of an unexpected nature and could be caused by disruption in the fuel supply, natural disaster or an emergency. In the event of a temporary closure the effects on traffic and transportation would be similar to those for normal operation of the facility.

At the end of the project life the facility would be closed in an orderly manner. At that time facility closure and decommissioning would be completed in a manner that: (1) protects the health and safety of the public, and (2) is environmentally acceptable. One-year prior to a planned closure, the applicant would submit a specific decommissioning plan to the Energy Commission for approval.

At the time of closure all then applicable LORS would be identified and the closure plan would address how these LORS would be complied with. The effects of project closure on traffic and transportation would be similar to those discussed for the project construction phase. Closure would involve a peak work period with commute traffic. The removal of waste and other materials would produce impacts from truck traffic. At this time no conclusions can be drawn on the effects of project closure on traffic and transportation.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all federal, state, and local LORS. Several proposed conditions of certification have been made to ensure compliance with the LORS. Therefore, the project is considered consistent with identified LORS.

MITIGATION

The applicant needs to comply with all LORS relating:

- To the transport of hazardous materials,
- The transport of oversized loads,
- To ensure that the necessary encroachment and transportation permits are obtained and complied with for any construction activity within public right-of-way,

The applicant should also implement the following traffic and transportation mitigation measures:

- Use proper signs and traffic control measures in accordance with Caltrans, County of Sacramento, County of Yolo, and the City of Elk Grove requirements for linear construction projects and projects occurring during peak traffic hours;
- Coordinate construction activities with appropriate state, city, and county departments and the Union Pacific Railroad in order to maintain traffic flow and safety;

- Enforce a policy that all project-related parking for plant construction or linears occurs in designated parking areas;
- Repair any roadway damage associated with the linears and the plant construction traffic. Any repair work required shall be coordinated with the appropriate city and county planning department and Caltrans; and
- Prepare a Traffic Control Plan subject to review by the Counties of Sacramento and Yolo, City of Elk Grove, and Caltrans. The Traffic Control Plan (TCP) would need to cover traffic associated with both plant construction, the associated linears, and the two gas compressor stations.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff's has analyzed the available capacity for regional roadways and it was determined that the potentially affected roadways have the capacity to accommodate projected related for construction and operation of the project. Staff has concluded that during the construction phase, increased roadway demand resulting from the daily movement of workers and materials would not significantly increase congestion and delay, and the level of service on each of the roadways segments would be at acceptable levels.

The potential impact of construction traffic affecting school bus pick-up/drop-off activity on Twin Cities and Clay East roads would be mitigated through proposed condition of certification **TRANS-7**, which requires the applicant to avoid the school bus travel intervals.

The operational phase for the plant would result in only a slight increase in the daily movement of workers and materials such that the impact would be negligible. The transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal, state, and local standards and permits established to regulate the transportation of hazardous substances. The traffic and transportation impacts resulting from construction can be mitigated to a level of insignificance by implementing the following recommendations incorporated in staff's proposed conditions of Certification.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with Caltrans and other relevant jurisdictions' limitations on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any permits received during that reporting period. In addition, the project

owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-2 The project owner or its contractor shall comply with Caltrans and other relevant jurisdictions' limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In Monthly Compliance Reports, the project owner shall submit copies of permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-3 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its Monthly Compliance Reports, copies of all permits/licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances.

TRANS-4 During construction of the power plant and all related facilities, the project shall develop a parking and staging plan for all phases of project construction to enforce a policy that all project-related parking occurs on-site or in designated off-site parking areas.

Verification: At least 60 days prior to start of site mobilization, the project owner shall submit the plan to the (City and/or County) for review and comment, and to the CPM for review and approval.

TRANS-5 The project owner shall consult with Caltrans, Counties of Sacramento and Yolo, and the City of Elk Grove and prepare and submit to the CPM for approval a construction traffic control plan and implementation program which addresses the following issues:

- Timing of heavy equipment and building materials deliveries;
- Redirecting construction traffic with a flagperson;
- Signing, lighting, and traffic control device placement if required;
- Need for construction work hours and arrival/departure times outside of peak traffic periods;
- Ensure access for emergency vehicles to the project site;
- Temporary travel lane closure; and
- Access to adjacent residential and commercial property during the construction of all linears.

Verification: At least 30 days prior to site mobilization, the project owner shall provide to the CPM a copy of the referenced documents.

TRANS-6 Following completion of CPP construction, the project owner shall repair any damage to area roadways incurred during construction to the roads, pre-project construction condition.

Protocol:

Prior to start of construction, the project owner shall photograph, videotape or digitally record images of roadways impacted by the linears and plant construction traffic. For the plant construction this would include Twin Cities Road between SR-99 and the Rancho Seco facility and Clay East Road between Twin Cities Road and the entrance to the CPP site. For the natural gas pipeline this would include those roadways to be impacted by the construction traffic and the laying of the pipelines. The project owner shall provide the Compliance Project Manager (CPM), the County of Sacramento and Caltrans (as necessary) with a copy of the images for their roadway system. Prior to start of construction, the project owner shall also notify the City of Elk Grove, County of Sacramento, and Caltrans about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction related activities associated with other projects.

Verification: Within 30 days after completion of the CPP construction, the project owner shall meet with the CPM, the City of Elk Grove, and the County of Sacramento, and Caltrans (as needed) to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near original condition as possible. Following completion of any regional road improvements, the project owner shall provide to the CPM a letter from the City and County of Sacramento, and Caltrans if work occurred within their jurisdictional public right of way stating their satisfaction with the road improvements.

TRANS - 7 The project owner consult with the local school district in developing a construction travel schedule that restricts the workforce trips to intervals outside of the times that the local school districts' buses are operating.

Verification: The project owner shall verify the local school bus schedules and submit a construction travel schedule that avoids the times that the buses are operating on SR 104/Twin Cities Road and Clay East Road.

TRANS-8 The project owner shall work with staff to ensure that the stacks are marked and lighted so that they do not create a hazard to aerial spraying companies.

Verification: At least 30 days prior to construction, the project owner shall submit plans for the marking and lighting of the stacks to staff for review and approval.

TRANS-9 The project owner shall reroute construction traffic to avoid the use of Clay East Road located west of the proposed plant entrance for the CPP. This would be done by SMUD constructing a new plant access road that would take traffic from the Rancho Seco Park entrance road south to Clay East Road.

Protocol:

SMUD would develop a traffic control plan that would ensure construction traffic would travel on Twin Cities Road to the Rancho Seco Park entrance road. The construction traffic would then take the Rancho Seco Park entrance road to a dedicated plant access road, to be constructed by SMUD, south to Clay East Road. At the intersection with Clay East Road construction traffic would turn west on Clay East Road and proceed to the CPP entrance road.

In exiting the CPP site construction traffic would turn east on Clay East Road and proceed to the dedicated plant access road in order to return to Twin Cities Road.

Verification: At least 30 days prior to the start of project construction the project owner shall provide the CPM with written documentation on the completion of the dedicated plant access road from the Rancho Seco Park entrance road to Clay East Road.

The project owner shall also include traffic control measures that ensures construction traffic would not use the western portion of Clay East Road. This could include the use of signage at the intersection of Clay East Road and Twin Cities Road directing construction traffic to the Rancho Seco Park entrance road, and a flagman at the CPP entrance road to ensure construction traffic travels from the construction area east on Clay East Road, to the access road.

REFERENCES

- SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.
- SMUD (Sacramento Municipal Utility District) 2002p. AFC Supplement B April 15, 2002. Docket date April 15, 2002.
- SMUD (Sacramento Municipal Utility District) 2002o. Data Responses, Set 3A April 15, 2002. Docket date April 15, 2002.
- Caltrans 2002a. Letter from Jeffrey Pulverman, Caltrans to James Fore, CEDC, regarding review of the Cosumnes Power Plant project. February 13, 2002. Docketed February 27, 2002
- Stigelmayer 2001. Letter from Stephen Stigelmayer, Chairman, Herald Fire Protection District, dated November 21, 2001 to Sandra Fromm, Energy Commission , regarding SMUD Cosumnes Power Project. November 21, 2001. Docket date December 7, 2001.
- CEC (California Energy Commission) 2002b. Sign-in sheets from SMUD Cosumnes Project Site visit and Data Response/Issue Resolution Workshop, held on January 23-24, 2002. Docket date January 25, 2002. State of California Department of Transportation. Traffic and Vehicles Data Systems Unit . 1999 All Traffic Volumes on the California State Highway System.
- AUESD (Arcohe Union Elementary School District). 2002a. Chris Marciel, telephone conversation with James Fore, (California Energy Commission), March 13, 2002.
- HCM (Highway Capacity Manual), Special Report 209, Third Edition, Transportation Research Board, Washington D.C., 1994.
- Sacramento County Planning Department, Sacramento County General Plan Circulation Element. December 15, 1993 Revised as of May 2, 1997
- Yolo County Planning Department, Yolo County General Plan Circulation Element. Adopted by Board of supervisors. July 17, 1983.

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelum, Ph.D.

INTRODUCTION

The energy from the proposed Cosumnes Power Plant (CPP) will be delivered to the Sacramento Municipal Utility District (SMUD) transmission system through a new double-circuit 230 kV, overhead transmission line running 0.4 miles from the plant's 230 kV switchyard to the main switchyard at SMUD's decommissioned nuclear-powered Rancho Seco Plant to the north. This Rancho Seco Switchyard serves as a major energy distribution hub for the SMUD system and will be used to distribute the CPP-generated energy into both this and the Pacific Gas and Electric (PG&E) northern California power grid. The proposed CPP site was chosen for land availability and its proximity to this major SMUD distribution hub (SMUD 2001a, page 5-1). Since the proposed interconnection line will be owned and operated by SMUD (SMUD 2001a, pages 1-3 and 5-1), it will be designed and built according to standard SMUD practices that ensure compliance with existing health and safety laws, ordinances, regulations, and standards (LORS) as will be discussed later.

The purpose of this staff analysis is to assess the proposed transmission line construction and operational plan for incorporation of the measures necessary for compliance with these health and safety LORS. If such compliance is established, staff will not recommend further mitigation measures with respect to the field and non-field issues of concern in this analysis; if not, staff would recommend revisions as appropriate. Staff's analysis will focus on the following issues:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead transmission lines as proposed for CPP. The potential for these impacts will depend on the project's compliance with specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at those aspects of the structure or dimensions of electric power lines that influence the magnitude of the impacts noted above. The only such regulations are those requiring such lines to be located underground because of the potential for visual impacts on the landscape.

AVIATION SAFETY

Any hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

Federal

- Title 14, Part 77 of the Federal Code of Regulations (CFR), “Objects Affecting the Navigation Space.” Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a “Notice of Proposed Construction or Alteration” is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid the aviation hazards of concern.
- FAA Advisory Circular (AC) No. 70/460-2H, “Proposed Construction and or Alteration of Objects that May Affect the Navigation Space.” This circular informs each proponent of a project that could pose an aviation hazard of the need to file the “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, “Obstruction Marking and Lighting.” This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials, including the ground, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts can be assessed from field strength estimates obtained for the line. The interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio-frequency communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

Federal

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing

force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. For such lines, such interference is minimized from the use of specific low-corona cables as conductors. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis.

State

- General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced in this case by the electric field directly induced by the energized line in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these induced fields. When incorporated into the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

AUDIBLE NOISE

Industry Standards

There are no design-specific federal regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience. These practices are effective but do not significantly impact line safety, efficiency, maintainability and reliability. All modern overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot right-of-way.

NUISANCE SHOCKS

Industry Standards

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal

objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. As with the proposed overhead line, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

State

- General Order 95 (GO-95), CPUC, “Rules for Overhead Electric Line Construction” specifies tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 Section 1250 of the California Code of Regulations: “Fire Prevention Standards for Electric Utilities” specifies utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks addressed through the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

State

- GO-95, CPUC. “Rules for Overhead Line Construction”. These rules specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements ensures the safety of the general public and line workers.
- Title 8, California Code of Regulations, Sections 2700 through 2974. “High Voltage Electric Safety Orders”. These safety orders establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

Local

There are no shock hazard-related requirements on the physical dimensions of power lines at the local level.

Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the

public. They are intended to minimize the potential for direct or indirect contact with the energized line.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It required each electric utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. SMUD and the other utilities that are not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires each applicant to show how each proposed overhead line would be designed to comply with the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability, efficiency and maintainability. Therefore,

it is up to each applicant to ensure that such measures are applied to an extent without significant impacts on line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess each line design for effectiveness at field strength reduction. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area.

Industrial Standards

There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York, Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because only it can penetrate the soil, building, and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

SETTING

According to information from SMUD (SMUD 2001a, pages 1-1, 2-2, 5-1, 8.4-5, 8.5-7, 8.6-4, and 8.8-2), the proposed CPP and related switchyard will be located on approximately 30 acres within a 2,480-acre, SMUD-owned land. The site is in southeastern Sacramento County, approximately 25 miles southwest of the City of Sacramento, 4 miles north of the San Joaquin County line, and 5 miles west of the Amador County line. The site, as previously noted, was chosen partly because of its proximity to the Rancho Seco Switchyard, through which the generated energy would be distributed (SMUD 2001a, page 5-1). Such proximity would allow for electrical interconnection with the relatively short (0.4-mile) transmission line proposed.

The proposed site is within an undeveloped portion of SMUD's property surrounded by undeveloped open spaces, the Rancho Seco Nuclear Power Plant and Reservoir, and a few permanent rural residences, the nearest of which is 800 feet to the southwest. As more fully discussed by SMUD (SMUD 2001a, pages 8.4-5 through 8.4-7, 8.8-18, and 8.11-2), the site is currently used only for cattle grazing for weed control and is part of 2,480 acres purchased by SMUD for locating the Rancho Seco Plant operated between 1974 and 1978. A portion of the proposed project site was intended for construction of Unit 2 of the Rancho Seco Plant. A 40-acre portion is used for a solar farm that currently produces electricity. The Rancho Seco Plant and related facilities are immediately to the north.

The route of the project's transmission line will be located entirely within SMUD's property lines and will run parallel to the 230 kV double-circuit PG&E line that extends from the Rancho Seco Switchyard to the Bellota Substation to the south. Since the line will traverse grazing land without nearby residences, the residential field exposure of the present concern would be insignificant for this project. The only project-related EMF exposures of potential significance are the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, approved guests, or individuals in transit across the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern.

PROJECT DESCRIPTION

The proposed CPP transmission line will consist of the segments listed below:

- A new double-circuit and single-circuit 230 kV overhead line within a 0.4-mile route extending from the project's on-site, 230 kV switchyard to the existing Rancho Seco 230 kV Switchyard to the north;
- The new CPP 230 kV Switchyard; and
- Relatively minor project-related modifications at the Rancho Seco Switchyard to be interconnected.

As more fully discussed in the information from the applicant (SMUD 2001a, page 5-8, and 2002p, pages 1-3), the proposed project line will be carried on double-circuit and single-circuit steel poles of between 85 feet and 125 feet as it is routed within SMUD-owned property. The typical structures and dimensions of these support poles were

provided by SMUD as relevant to line safety and field reduction effectiveness. Six such towers would be used. Details of the proposed tower structure and conductor placement schemes were also provided. The reason for designing the proposed line according to the previously-noted standard SMUD practice, is the current PUC requirement to incorporate the field-reduction guidelines of the area's electric utility as a standardized way of dealing with the concern about line EMF and health. The service utility in this case is SMUD whose field-reducing guidelines were established accordingly. Staff's only requirement for this SMUD project is SMUD's verification of its intention to implement the specific measures involved. Any non-SMUD line that is proposed for this SMUD service area would have to be designed to incorporate these same EMF-reducing measures. Effective incorporation would later be verified through operational-phase field strength measurements whose results would be used for comparison with fields from SMUD lines of the same voltage and current-carrying capacity.

IMPACTS

GENERAL IMPACTS

GO-95, and Title 8, CCR Section 2700 et seq., as noted in the LORS section, ensure the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards. Of secondary concern are the noted field impacts manifesting themselves as nuisance shocks, radio noise, communications interference and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since applied field-reducing measures can affect line operations and safety, the extent of their implementation and resulting field strengths will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability and maintainability. SMUD established its own design guidelines as best applicable to its utility service area. Given the present CPUC requirement to maintain the noted impacts within the levels associated with existing lines, compliance with applicable LORS would be achieved by showing the project-specific fields to be within the range associated with SMUD lines of the same voltage and current-carrying capacity.

PROJECT SPECIFIC IMPACTS

Aviation Safety

As noted by the applicant (SMUD 2001a, page 5-13), the proposed transmission line would not pose a collision hazard to any area aircraft when judged according to current FAA criteria regarding distance and direction from the primary runway. Furthermore, the line's support towers would (at a maximum height of 125 feet) not be tall enough to pose a potential collision hazard to area aircraft as defined using the criteria in the previously noted FAA regulations. The same lack of a collision hazard has been true for the 230 kV PG&E Rancho Seco-Bellotta line running alongside the proposed line. While an FAA "Notice of Construction or Alteration" will not be required for the proposed line, SMUD will contact the FAA about the current proposal, as is standard industry practice.

Audible Noise and Interference With Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. The proposed lines would be built and maintained according to SMUD practices that minimize such surface irregularities and discontinuities. Moreover, the potential for such corona-related audible noise and interference is usually of concern for lines of 345 kV and above and not the proposed and similar SMUD lines of 230 kV. The low-corona design for the proposed project line would be the same as used for other SMUD lines of the same voltage (SMUD 2001a, page 5-11) in compliance with the previously noted FCC (Title 47, CFR §15.25) and GO-52 prohibitions against interference with radio communication. Since (a) the edge of the right-of-way would mark the beginning of the areas of possible human habitation around a high-voltage line, and (b) the nearest permanent human residence is about 800 feet from the proposed route, staff does not expect the proposed line to generate any complaints about operational noise, or interference with residential radio or television use. In the unlikely event of specific complaints, SMUD would be responsible (as with other SMUD lines) for the necessary mitigation as required by the FCC. Staff recommends a specific condition of certification (**TLSN-3**) in this regard. For an assessment of noise from all aspects of the project construction and operation, please see staff's analysis in the **Noise** section.

Fire Hazards

Standard fire prevention and suppression measures for all SMUD lines would be implemented for the proposed line. SMUD's intended compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach (SMUD 2001a, pages 5-9 through 5-14). Moreover, the route for the proposed interconnection line would mostly be undeveloped land with no trees or brush that would pose a significant hazard of contact-related line fires. SMUD's fire prevention practices for high-voltage lines would be implemented in compliance with Title 14, Section 1250 of the California Code of Regulations.

Hazardous Shocks

SMUD's noted intention to implement the GO-95- related measures together with requirements in specific sections of Title 8, California Code of Regulations, §2700 et seq. against direct contact with the energized line, as is normal SMUD practice (SMUD 2001a, pages 5-9 through 5-14), would serve to minimize the risk of hazardous shocks. Staff recommends condition of certification **TLSN-1** to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

The potential for nuisance shocks around the proposed lines would be minimized through standard grounding practices (SMUD 2001a, page 5-13). Staff recommends condition for certification **TLSN-2** to ensure such grounding.

Electric and magnetic field exposure

Since (a) the proposed CPP is of similar generating capacity as the decommissioned Rancho Seco Plant (SMUD 2001a, page 5-11) and (b) the power from CPP would be transmitted using the same electrical distribution infrastructure as the Rancho Seco

Plant, staff concludes that the electric and magnetic fields generated by the CPP lines would be the same as those generated by the Rancho Seco Plant in the past. (The present CPUC policy against any EMF-related retrofit of existing infrastructure means that EMF related compliance would be achieved by maintaining field intensities within levels associated with existing designs). The only area of potential change during CPP operation would be along the 0.4-mile transmission line connecting CPP to the Rancho Seco Switchyard (within SMUD's property lines). This change would derive directly from the line's contributions to existing field levels. The environmental acceptability of these contributed fields (as compared with fields from SMUD lines of similar voltage and current-carrying capacity) would depend on SMUD's implementation of the field strength-reducing measures required under current CPUC policy. SMUD has identified these field-reducing approaches in their current guidelines SMUD (SMUD 2001a, page 5-12). It is the effective incorporation of the related field reduction measures that constitutes compliance with the field and non-field health and safety LORS of concern to staff.

Details of the field reduction approaches in SMUD's guidelines were provided to staff with respect to the following:

- Distance between the conductors and the ground;
- Spacing between conductors on the same line
- Distance between conductors in nearby lines;
- Line current levels; and
- Current flow alignment for effective field cancellation.

Since these field reducing measures have been incorporated into the proposed line design to the extent SMUD considers to be without impacts on line safety, efficiency, reliability and maintainability, staff considers further mitigation as presently unnecessary but recommends a specific condition of certification (**TLSN-4**) to allow for validation of the reduction efficiency attributable to the proposed line design. The need for further mitigation would be assessed by comparing the measured field strengths with fields from SMUD lines of the same voltage and current-carrying capacity.

CUMULATIVE IMPACTS

Since the proposed CPP line would be designed according to the applicable SMUD design guidelines (as currently required for effective field management), staff expects any contribution to cumulative area exposures to be at the same level as from existing SMUD lines. This similarity in contributed fields would reflect compliance with current CPUC requirements on field contributions from new lines. The actual contribution from the proposed line design would be assessed from field the strength measurements specified in **TLSN-4**.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information showing that while there are specific pockets with a minority population of greater than 50%, the average within a six-mile

radius of the proposed project is 16.5 percent. Census 1990 information shows the low-income population as 7.6 percent within the same radius. Since the fields from the project's transmission lines would be encountered at levels associated with SMUD lines of similar voltage and current-carrying capacity, there would be no disproportionate impacts within any potentially exposed population group.

COMPLIANCE WITH LORS

Current CPUC policy on safe EMF management requires that each service utility incorporate specific field reduction measures into the design for new or upgraded high-voltage lines, as previously noted. Staff recommends compliance with this requirement for all the lines that are permitted by the California Energy Commission. Since SMUD proposes to apply the necessary measures to the design for the proposed CPP line in ways that minimize the field and non-field impacts of concern to staff, we consider the proposed design and operational plan to be in compliance with all applicable health and safety LORS.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead or underground lines, the public health significance of any CPP-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant for the proposed 0.4-mile interconnection line given the general absence of residences along the proposed route. On-site worker or public exposures would be short-term and at levels associated with SMUD lines of similar designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans.

The potential for nuisance shocks will be minimized through grounding and other field-reducing measures to be implemented by SMUD in keeping with current SMUD guidelines reflecting common industry practices. The proposed line support structures are neither tall enough nor close enough to pose a significant collision hazard to area aircraft, according to FAA criteria. The use of low-corona line design together with appropriate corona-minimizing construction practices would minimize the potential for corona noise and its related interference with radio-frequency communication anywhere in the project area.

RECOMMENDATIONS

Since the project's 230 kV lines would be designed to minimize the safety and nuisance impacts of specific concern to staff and routed within SMUD's property boundaries away from residential areas, staff does not recommend any changes to the proposed construction and operational plan. If the proposed power plant is approved, staff would recommend that the Energy Commission adopt the conditions of certification specified

below to ensure implementation of the measures necessary to achieve the field reduction and safety assumed by SMUD for the plant's transmission line.

CONDITIONS OF CERTIFICATION

TLSN-1 SMUD, the project owner, shall construct the proposed project transmission line according to the requirements of CPUC's GO-95, GO-52, Title 8, Section 2700 et seq. of the California Code of Regulations and PG&E's EMF reduction guidelines arising from CPUC Decision 93-11-013.

Verification: Thirty days before starting construction of the CPP's transmission line or related structures and facilities, SMUD shall submit to the Commission's Compliance Project Manager (CPM) notification that the overhead section will be constructed according to the requirements GO-95, GO 52, Title 8, Section 2700 et seq. of the California Code of Regulations, and SMUD's EMF-reduction guidelines arising from CPUC Decision 93-11-013.

TLSN-2 SMUD shall ensure that all metallic objects along the route of the overhead section are grounded according to industry standards.

Verification: At least 30 days before the lines are energized, SMUD shall transmit to the CPM a letter confirming its intention to comply with this condition.

TLSN-3 SMUD shall take reasonable steps to resolve any complaints of interference with radio or television signals from operation of the proposed line.

Verification: Any reports of line-related complaints shall be summarized for the first year along with related mitigation measures, and provided to the CPM.

TLSN-4 SMUD shall measure the strengths of the line electric and magnetic fields from the proposed 0.4-mile line before and after it is energized. Measurements shall be made at representative points (on-site and along the line route) as necessary to identify the maximum field exposures possible during operations. Staff would assess the need for further mitigation through comparison with fields from SMUD lines of the same voltage and current-carrying capacity.

Verification: SMUD shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

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WASTE MANAGEMENT

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INTRODUCTION

This Preliminary Staff Assessment presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Cosumnes Power Plant (CPP). Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes will be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project will be managed in an environmentally safe manner; and
- The disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Resource Conservation and Recovery Act (42 U.S.C. § 6922)

RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding:

- Record keeping practices which identify quantities of hazardous wastes generated and their disposition,
- Labeling practices and use of appropriate containers,
- Use of a manifest system for transportation, and
- Submission of periodic reports to the EPA or authorized state.

Title 40, Code of Federal Regulations, part 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity; and specific types of wastes are listed.

STATE

California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended).

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)

These regulations set forth minimum standards for solid waste handling and disposal, guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.

Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)

These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

Title 22, California Code of Regulations, §67100.1 et seq. (Hazardous Waste Source Reduction and Management Review)

These sections establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.

LOCAL

The Sacramento County Environmental Management Department, Environmental Health Division, has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed CPP. The Hazardous Materials Division of this Department is responsible for administering and enforcing compliance with the California Hazardous Waste Control Law.

The CPP must also comply with the Sacramento County Fire Code, which governs the storage and use of hazardous materials and wastes per Fire Code requirements. This

Code also requires that CPP obtain a Hazardous Materials and Waste Storage Permit from the County.

SETTING

PROJECT AND SITE DESCRIPTION

The proposed Cosumnes Power Plant would be located on approximately 30 acres of a 2,500-acre parcel owned by the Sacramento Municipal Utility District (SMUD) and containing the Rancho Seco Nuclear Plant, which is now being decommissioned. The proposed site is located on the north side of Clay East Road in Sacramento County, California, approximately 4 miles north of the San Joaquin County line and 5 miles west of the Amador County line. Rancho Seco exists approximately 2000 feet directly north of the site, and electric transmission lines run along the proposed site's western border. An additional 20-acre portion of the SMUD property located immediately south of the proposed project site across Clay East Road would be used as a laydown area during CPP construction. The proposed project site is currently used as a publicly inaccessible fenced buffer area for the Rancho Seco Plant, and has been leased out for cattle grazing to control vegetation.

The proposed CPP will be a combined-cycle facility comprised of four natural gas-fired Combustion Turbine Generators (CTG), four Heat Recovery Steam Generators (HRSG), two condensing Steam Turbine Generators (STG), two deaerating surface condensers, and two mechanical draft cooling towers, along with accompanying control and administration facilities, electrical transformers, and other related equipment. A natural gas pipeline would be constructed from the termination point of an existing SMUD pipeline 26 miles to the northwest to the CPP site. A second pipeline would be constructed northward to the Rancho Seco plant to intercept and supply project water delivered from the American River via the Folsom-South Canal and an existing underground water line. An additional pipeline would be constructed to discharge treated, spent cooling water to Clay Creek. A short (0.4-mile) 230 kV transmission line would be constructed to connect the CPP with the existing Ranch Seco electric switchyard. As proposed, the electric generating system will be developed in two 500-megawatt (MW) phases to produce a nominal generating capacity of approximately 1,000 MW at a projected overall annual availability factor of 92 to 98 percent.

Originally, the AFC was completed and submitted without the performance of an Environmental Site Assessment (ESA) conducted according to recognized standard methods. Section 8.13.3.2 of the AFC states that this was due to the fact that the proposed project site had been under SMUD's continuous control since 1966. As an alternative, the applicant summarized the historical uses of the site and surrounding areas (8.13.3.1), and summarized the results of a database search and site inspection (8.13.3 and 4). Subsequent to receiving the AFC, CEC staff, in a data request, asked that a Phase I ESA be performed for the site, the laydown area, and the 26-mile gas pipeline route and that this assessment be prepared according to American Society for Testing and Materials (ASTM) Standard E 1527 published in July, 2000. An ESA was submitted, dated March 18, 2002. Each of the noted efforts (the AFC and the ESA)

include information not reported in the other, including a discussion of past mining and feedlot operations on nearby property and a description of recorded (and remediated) leaking underground storage tanks within ½ mile of the proposed project site. Both documents noted that the Rancho Seco Nuclear Power Plant is listed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) because there is a closed landfill, the site contains underground storage tanks, and it is a registered generator of hazardous waste. Both documents also concluded that there is no historic, anecdotal, database, or observable site evidence indicating any environmentally detrimental activity on the proposed site nor any chemical, biological, radioactive, or other type of contamination to the site.

It is staff's opinion that the Phase I ESA was inadequate and did not conform to the ASTM standard. The Phase I ESA also lacked any assessment of the gas pipeline route. Both CEC staff and the staff of the California Department of Toxic Substances Control (DTSC) requested an assessment of the gas pipeline route. Staff therefore issued a second data request asking for information on the precise boundaries of Rancho Seco Nuclear Power Plant, the schedule for decommissioning the facility, and that sampling and analysis of soil and groundwater be conducted for the planned Cosumnes Power Plant site and the laydown area, including analysis for radioactive wastes. This data request also reiterated staff's earlier request for a Phase I ESA for the gas pipeline route.

The applicant has provided information on the natural gas pipeline route and the site and laydown areas (SMUD 2002z). Staff has reviewed and evaluated the modified Phase I ESA provided for the 26-mile pipeline and agrees with the applicant's assessment that minimal hazardous wastes are expected to be encountered along the pipeline route. Staff also agrees with the applicant that migration of hazardous waste and/or radioactive waste from the Rancho Seco nuclear power plant to the proposed site and laydown areas has not occurred. Therefore, staff finds it unnecessary for the applicant to conduct a sampling and analysis plan at the proposed site and laydown areas. Staff believes that standard COCs **Waste-4 & 5** (which require having a Registered Professional Engineer or Geologist with experience in remedial investigation and feasibility studies available for consultation during soil excavation and grading activities) are adequate to address any soil or groundwater contamination that may be encountered.

IMPACTS

PROJECT SPECIFIC IMPACTS

Construction

Site preparation and construction of the proposed generating plant and associated facilities will generate both nonhazardous and hazardous wastes in solid and liquid forms.

Nonhazardous solid wastes

Nonhazardous solid wastes anticipated to be generated during construction are detailed in Section 8.13.4.1.1 of the AFC (SMUD 2001a). Approximately 170 tons of wood, paper, glass and plastics, 120 tons of excess concrete, and 45 tons of scrap metal could be generated during project construction. Wherever possible and practical these wastes will be recycled, particularly the paper products and metals. Nonrecyclable wastes would be collected and disposed of in a Class III landfill. A possible exception might include the disposal of the waste concrete in a clean fill site if one is available.

Nonhazardous liquid wastes

Nonhazardous liquid wastes will be generated during construction including sanitary wastes, equipment washwater, stormwater runoff, and wastewater from the gas pipeline hydrotesting process. Because the area groundwater is expected to be encountered only at depths in excess of 150 feet, it is not anticipated that construction excavations will need to be dewatered. In the unlikely event that excavation dewatering will have to occur, additional nonhazardous wastewater will be generated.

Sanitary waste will be collected in portable toilet facilities. Equipment washwater will be contained at the designated wash sites and disposed of offsite. Stormwater runoff will be managed according to an approved plan developed by the construction contractor and discussed in the **Soil and Water Resources** section of this document. Wastewater resulting from the hydrostatic test of the gas pipeline will be filtered to remove sediment and welding fragments, and then tested for contaminating components. The construction contractor will discharge non-contaminated hydrotesting water to an existing storm sewer along the pipeline corridor per applicable regulations. Contaminated wastewater would be trucked to the Sacramento Regional Wastewater Treatment Plant for disposal.

Hazardous wastes

Hazardous wastes anticipated to be generated during construction are discussed in Section 8.13.4.1.3 of the AFC (SMUD 2001a). Solid hazardous wastes may include spent welding materials and dried paint. Liquid hazardous wastes would include waste solvents along with flushing, cleaning and passivating (nitrate or phosphate solution) fluids. Minimal quantities of the solid wastes and solvents are anticipated. The liquid flushing, cleaning and passivating wastes would be generated in quantities estimated at one to two times the internal volumes of the pipes being cleaned.

The construction contractor would be considered the generator of hazardous wastes at this site during the construction period and would be responsible for proper waste handling, storage, disposal, record keeping, and employee training. Wastes would be accumulated at satellite locations and then transported daily to the 90-day storage area located at the site construction laydown area. The wastes thus accumulated would be removed from the site and transported by a certified collection company to a permitted TSD facility prior to the expiration of the 90-day limit.

Because of the outstanding data request by staff about the possible presence of hazardous and/or radioactive wastes within the site and the laydown area, and the possibility of hazardous wastes along the gas pipeline route, staff cannot state at this time what hazardous wastes, if any, may be encountered during site preparation and gas pipeline construction.

Operation

The proposed CPP will generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions.

Nonhazardous solid wastes

Nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, machine parts, electrical materials, empty containers, and typical worker and small office wastes. Approximately 120 cubic yards of these wastes are projected to be generated annually. Large metal parts would be recycled.

Zero liquid discharge system

In order to reduce and reuse wastewater in the plant, SMUD has proposed to implement a zero-liquid discharge (ZLD) system for the proposed CPP. This system will include a brine concentrator, crystallizer, and distillate and brine holding tanks.

The operation of the ZLD system will result in a generation of approximately 6.8 tons per day of salt cake waste. This will require disposal of about 2,500 tons of salt cake per year. Testing was done for similar ZLD systems in support of the Three Mountain Project and Pastoria Energy Facility siting cases in order to determine if the wastes might be classified as hazardous. Analyses of the solid wastes similar to those that would be generated from the softener as well as the crystallizer indicated that all metals of concern were below California regulatory limits that define hazardous waste (Ogden 2000a and PEF/Thompson 2000f). In order to ensure the correct classification of such wastes from the proposed project, however, staff proposes Conditions of Certification **WASTE-6** and **7**, which would require testing of the brine concentrator effluent and salt cake.

Although the solid waste generated from the crystallizer may not be classified as hazardous, it might be considered a California designated waste due to its high salt content. The category of designated waste includes nonhazardous waste that contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations that could exceed applicable water quality objectives or affect the beneficial uses of waters of the state (Cal. Code Regs., tit. 27, § 20210). Designated wastes are required to be disposed of at Class I or Class II disposal sites.

Although the applicant has not provided any detailed information on the ZLD system and process, it is reasonable to assume that the effluent from the brine concentrator would be subsequently routed back to the crystallizer for further concentration as done in ZLD systems. If the effluent were to contain hazardous levels of any constituent,

such concentration could be considered hazardous waste treatment, a process that would require a permit from the Department of Toxic Substances Control. However, since the effluent water is reused in the plant, a recycling exemption provided for in Health and Safety Code section 25132.2(c)(2) would apply as long as the following conditions are met:

1. The wastewater must be recycled at the same facility at which it was generated.
2. The wastewater must be recycled within generator waste accumulation time limits.
3. The wastewater must be managed in accordance with all applicable requirements for generators of hazardous wastes under Health and Safety Code Chapter 6.5 and regulations adopted by DTSC.

Staff proposed Condition of Certification **WASTE-7** requires testing of the effluent from the brine concentrator as a hazardous waste. If it is determined to be hazardous, CPP would have to apply for a recycling exemption from DTSC.

Construction and operation of the zero liquid discharge system would not have any significant effects on any of the other waste streams generated at CPP.

Nonhazardous liquid wastes

As discussed in Section 8.13.4.2.2 of the AFC (SMUD 2001a), two facility systems will deal with nonhazardous liquid wastes, the primary or Plant Wastewater System, and the second or Sanitary Wastewater System. This secondary system will collect sanitary liquid wastes, treat them in a package plant, and discharge the effluent to a leachfield. The primary system deals principally with wastewater resulting from circulating system blowdown, which includes wastes recycled from the purification of power-cycle makeup water and HRSG and auxiliary boiler blowdown. The system also manages wastewater from general plant drains and the oil/water separator, drains from the chemical feed area containments, and evaporative cooler blowdown. Most of these wastes will have been exposed to treatment chemicals and large volumes will result from processes that concentrate dissolved solids. Some of these wastes will be directed through the oil/water separator whose effluent will be discharged to the plant septic tank and leachfield (see AFC Section 2.2.9.1.2). [Staff notes that the ZLD description prepared by the applicant (SMUD 2002aa) does not specifically address this particular discharge and thus staff assumes that the information in the AFC is correct.] Depending on quantity, wastewater containing cleaning chemicals that results from combustion turbine washing operations will be either transported offsite for disposal at an approved wastewater treatment facility, or directed to the plant package treatment system. The ZLD system proposed by the applicant would process all plant wastewater, and therefore eliminate the need for a National Pollution Discharge Elimination System (NPDES) discharge permit from the Regional Water Quality control Board (RWQCB).

Hazardous wastes

Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, used oil filters, laboratory waste, Selective Catalytic Reduction (SCR) and oxidation catalysts, oily rags and absorbents, and used acidic and alkaline

chemical cleaning wastes (potentially containing high concentrations of heavy metals). Table 8.13-2 in the AFC lists the anticipated hazardous wastes (except the cleaning solutions) along with their origin, composition, estimated quantity, hazard class, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. For example, all the oil and oil-contaminated wastes would total approximately 2,400 pounds per year, and all would be recycled. Volumes of the acidic and alkaline cleaning wastes are not estimated in the AFC, but all would be accumulated during maintenance activities and then disposed of offsite. The emission control catalysts would require regeneration every three to five years resulting in the generation of a total of 16,000 pounds of waste material. The SCR generated portion of that total (8,000 pounds) could require disposal in a Class I facility if recycling / regeneration proves not to be feasible. Chemical materials collected in drains as a result of spillage, overflows, and maintenance operations will be neutralized onsite (if necessary) and directed into the cooling tower basin. In addition, Table 8.13-2 notes that up to 340 pounds per year of cooling tower sludge will normally require disposal in a Class II facility, but could sometimes require disposal as a hazardous waste.

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Section 8.13.5 of the AFC indicates that the 120 cubic yards of nonhazardous solid wastes generated yearly at the CPP would be recycled if possible, or disposed of in a Class III landfill. Another 6.8 tons per day (2,500 tons per year) of salt cake would also be generated and require disposal at a Class I, II or III landfill depending upon the results of toxicity testing. Section 8.13.5.1 further notes that B.F.I., the company that presently removes nonhazardous solid wastes from the Ranch Seco Plant, would also collect wastes from the CPP. B.F.I. currently transports waste to the Elder Creek Road transfer facility and then to the Forward Landfill in Manteca, California. AFC Table 8.13-3 notes that this landfill has a permitted capacity of 16 million cubic yards, a remaining capacity of 13 million cubic yards, and an estimated closure date of 2006. The AFC notes that Kiefer Road Landfill in Rancho Cordova California, with a remaining capacity of 88 million cubic yards and an estimated closure date of 2035, is a probable alternative to the Forward Landfill. Although it is difficult to estimate the density of the salt cake from the ZLD system and thus the number of cubic yards generated each year, staff is able to estimate that each ton of salt cake would be approximately one cubic yard. Given that more than 88 million cubic yards of Class III landfill capacity exists through the year 2035 and potentially beyond, staff finds that disposal of the solid wastes generated by the CPP can occur without significantly impacting the capacity or remaining life of any of these facilities.

Section 8.13.5.1 of the AFC indicates that of the 250 RCRA TSD facilities in California listed by the USEPA, the closest to the proposed CPP are a Safety-Kleen transfer station and Ramos Environmental, in West Sacramento. Both facilities can recycle used oil, and the Safety-Kleen facility can also store and transfer several other types of hazardous waste. The subsequent sections of the AFC discuss the three Class I landfills in California: the Buttonwillow Landfill in Kern County, the Westmorland Landfill in Imperial County, and the Kettleman Hills Landfill in King's County; and note the existence of other offsite hazardous waste treatment and recycling facilities in California

capable of handling various portions of the facility's hazardous waste. Together, the two Safety-Kleen facilities and the Kettleman Hills facility possess an excess of 17.1 million cubic yards of remaining hazardous waste disposal capacity, with remaining operating lifetimes up to the year 2050. Thus, even if the salt cake were to be placed in a Class I facility, no impact on waste disposal facilities would occur.

In summary, more than sufficient capacity is available in a variety of facilities to recycle, treat or dispose of the anticipated hazardous and non-hazardous wastes generated from the construction and operation of the proposed CPP without adverse impacts.

MITIGATION

In section 8.13.6 of the AFC the applicant states that the handling and management of wastes at the proposed CPP facility will follow the hierarchical approach described in the following order of preference from greatest to least:

1. Source reduction-- through pollution prevention measures
2. Recycling-- or reusing waste materials
3. Treatment-- to render the waste nonhazardous such as through neutralization,
4. Disposal-- of only those wastes that cannot be reduced, treated or recycled.

Sections 8.13.6.1 and 2 of the AFC discuss waste management measures CPP will employ during the construction and operation phases to manage and mitigate the impacts of the generation of liquid and solid non-hazardous and hazardous wastes. In addition, section 8.13.3.5 describes other measures that the Applicant will employ during pipeline construction to identify and manage areas of potential soil contamination that might be encountered on properties not belonging to the applicant.

Staff has examined the waste management related measures proposed by the Applicant and concluded that, together with applicable LORS and the Conditions of Certification proposed by staff, they will adequately assure that no significant adverse environmental impacts will result from the management and disposal of project-related waste.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Energy Commission staff concludes that the proposed Cosumnes Power Plant will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the California Department of Toxic Substances Control (DTSC). Because hazardous wastes will be produced during project construction and operation, both the CPP and its construction contractor will be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both CPP and its construction contractor will be required to properly store, package and label waste, use only

approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train their employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction and Evaluation Review and Plan must be prepared by the CPP, which meets the requirements of SB-14.

The issue of compliance with all LORS during site preparation and the construction of the gas pipeline remain unresolved until staff's data request is answered.

CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of the CPP project will add to the total quantities of waste generated in Sacramento County and the State of California. This facility will generate an estimated 335 tons of solid waste during construction and approximately 85 tons per year during operation (including about 5 tons of hazardous waste). Additionally, 2,500 tons per year of salt cake from the ZLD system would be generated. For comparative purposes, Section 8.13.7 of the AFC indicates that 703,660 tons of solid waste was disposed of in Sacramento County in the year 2000. The amounts anticipated to be generated by the proposed facility constitute an insignificant percentage increase to this total. Consequently, because recycling efforts will be prioritized wherever practical, and capacity is available in a variety of disposal facilities, the added waste quantities generated by CPP will not result in significant waste management impacts.

Staff has determined that the need for landfill placement of additional hazardous wastes generated during construction of the gas pipeline to be negligible.

FACILITY CLOSURE

Section 8.13.6.3 of the AFC discusses CPP's responsibilities for waste management in the event of a temporary facility closure due to a disruption in the supply of natural-gas fuel or damage to the facility due to a natural disaster; or permanent closure due to a cessation of operations. The applicant indicates that a contingency plan for temporary closure will be prepared prior to facility startup. In addition, a Risk Management Plan (AFC Section 8.12.8.4) will be established containing additional procedures to be followed in the event of temporary closure due to plant damage or the possible release of a hazardous waste or material into the environment.

During any type of facility closure (see staff's General Conditions section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section will adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation

time to 90 days and requiring proper containment) would be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure require preparation of an on-site contingency plan, which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As above, the plan must provide for the removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

For planned permanent closure, CPP will develop a facility General Closure Plan at least twelve months prior to commencement of closure and is committed to complying with LORS that are applicable at the time of closure. The applicant indicates (see AFC Section 8.13.6.3.2) that such a closure plan will emphasize the maximum recycling of facility components and 24-hour site security.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

Department of Toxic Substances Control, Cal-EPA

Comment: *DTSC has requested that a Phase I ESA be prepared for the gas pipeline route.*

Response: A Phase I ESA was prepared by the applicant pursuant to DTSC and CEC staff's guidance.

CONCLUSIONS AND RECOMMENDATIONS

Management of the wastes generated during construction and operation of the CPP will not result in any significant adverse impacts if the waste management measures proposed in the Application for Certification and the proposed conditions of certification are implemented.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner and, if necessary, its construction contractor, shall each obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

Verification: The project owner shall notify the CPM via the monthly compliance report of its receipt and keep a copy of the identification number on file at the project site.

WASTE-2 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner

shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-3 Prior to the start of both site mobilization and project operation, the project owner shall prepare and submit to the Sacramento County Environmental Management Department, for review and comment, and to the CPM for review and approval, a waste management plan for all wastes generated during construction and operation of the facility, respectively. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including storage, treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the construction waste management plan to the Sacramento County Environmental Management Department and the CPM. The operation waste management plan shall be submitted no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions within 20 days of notification by the CPM (or mutually agreed upon date). In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods.

WASTE-4 The project owner shall have a Registered Professional Engineer or Geologist, with experience in remedial investigation and feasibility studies, available for consultation during soil excavation and grading activities. The Registered Professional Engineer or Geologist shall be given full authority to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the qualifications and experience of the Registered Professional Engineer or Geologist to the CPM for approval.

WASTE-5 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the

nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action. Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the Central Valley Regional Water Quality Control Board (as appropriate), the Sacramento County Environmental Management Department, and the Sacramento Office of the California Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-6 The project owner shall test the salt cake product from the crystallizer for the presence of hazardous levels of metals. If levels are below ten times the Soluble Threshold Level Concentration as listed in Title 22, California Code of Regulations, section 66261.24, then future testing is not required unless there is a substantial change in the wastewater treatment process. If not classified as a hazardous waste, the project owner shall manage the salt cake product appropriately as a nonhazardous or designated waste unless it is sold as a commercial product.

Verification: As soon as practicable but no later than 30 days after the initial generation of salt cake, the project owner shall notify the CPM of the test results and the planned disposal method.

WASTE-7 The project owner shall test representative samples of the effluent from the brine concentrator for the presence of hazardous levels of metals. If test results indicate that the effluent is classified as hazardous, then the project owner shall apply to DTSC for a recycling exemption for hazardous waste treatment as provided for in Health and Safety Code section 25132.2(c)(2).

Verification: Within 60 days of beginning commercial operation, the project owner shall notify the CPM of the test results for the brine concentrator effluent. If applicable, the project owner shall include a copy of the DTSC application, and shall notify the CPM upon receipt of the exemption from DTSC.

REFERENCES

- Ogden 2000a. Detailed Mitigation Plan and Analysis of Impact Assessments in Resource Areas Affected by the Mitigation Plan. Three Mountain Power, LLC. AFC-99-02. Submitted to the California Energy Commission. August 21.
- PEF (Pastoria Energy Facility/Thompson) 2000f. Applicant's Data Request Responses (Third Data Response Submittal). Submitted to the California Energy Commission on April 3, 2000.
- SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.
- SMUD (Sacramento Municipal Utility District) 2002o. Data Response, Set 3A. April 15, 2002. Docket date April 15, 2002.
- SMUD (Sacramento Municipal Utility District) 2002s. Data Response, Set 3B – Responses to Data Request 184, 185, 186, 187, 188, 190, 197, 198, 200, 201, 203, 206, 207, 220, 230, 231, 232, 241, 242, 244, 245, 246, 247, 248, 249, 250, and 251. May 6, 2002. Docket date May 6, 2002.
- SMUD (Sacramento Municipal Utility District) 2002x. Data Response, Set 3D – Responses to Data Requests 188, 191, 201, 202, 204, 206, 207, 229, and 235. June 7, 2002. Docket date June 7, 2002.
- SMUD (Sacramento Municipal Utility District) 2002z. Data Response, Set 3E – Response to Data Request 229c. July 1, 2002. Docket date July 2, 2002.
- SMUD (Sacramento Municipal Utility District) 2002aa. AFC Supplement C – Zero Liquid Discharge Arrangement, Executive Summary. July 10, 2002. Docket date July 10, 2002.

WATER & SOIL RESOURCES

Greg Peterson, P.E., Phil Lowe, P.E., and Richard Latteri

INTRODUCTION

This section analyzes the potential effects on soil and water resources that would be caused by the Cosumnes Power Plant (CPP) as proposed by the Sacramento Municipal Utility District (SMUD). The analysis specifically focuses on:

- whether construction or operation would lead to accelerated wind or water erosion and sedimentation;
- whether the project would exacerbate flood conditions in the vicinity of the project;
- whether the project's demand for water would adversely affect surface or groundwater supplies;
- whether project construction or operation would lead to degradation of surface or groundwater quality; and
- whether the project would comply with all applicable laws, ordinances, regulations and standards.

This analysis pertains to Phase 1 and Phase 2 of the CPP. Where information is inadequate for Phase 2, staff identifies needed information.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

Clean Water Act (CWA)

The Clean Water Act (33 U.S.C. Section 1251 et seq.) was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards.

Section 401 of the Clean Water Act requires that any activity that may result in a discharge into a water body must be certified by the Regional Water Quality Control Board. This would apply to stream crossings during pipeline construction. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers (ACOE) to regulate the discharge of dredged or fill material within the waters of the U.S.

and adjacent wetlands. The ACOE issues individual site-specific or general (nationwide) permits for such discharges.

Reclamation Projects Authorization and Adjustment Act

The Reclamation Projects Authorization and Adjustment Act of 1992 (106 Stats. §§ 4593-4599) includes the Central Valley Project Improvement Act (CVPIA). The CVPIA amends previous authorizations of the Central Valley Project (CVP) to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation water supply, domestic water supply, and power generation uses.

STATE

California Constitution, Article X, Section 2

This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that waste, unreasonable use, or unreasonable method of use of water is prohibited.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. Water quality criteria for the project area are contained in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. This plan sets numerical and/or narrative water quality standards controlling the discharge of wastes to the state's waters and land. Those standards are applied to the proposed project through the Waste Discharge Requirements (WDRs) permit issued by the RWQCB.

Waste Water Reuse

Section 13552.6 of the Water Code specifically identifies that the use of potable domestic water for cooling towers, if suitable reclaimed water is available, is a waste or unreasonable use of water. The availability of reclaimed water is determined based on criteria listed in Section 13550 by the SWRCB. Those criteria include provisions that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and will not impact downstream users or biological resources.

Section 13552.8 of the Water Code states that any public agency may require the use of reclaimed water in cooling towers if reclaimed water is available, meets the requirements set forth in Section 13550, that there will be no adverse impacts to any existing water right, and that if public exposure to cooling tower mist is possible, appropriate mitigation or control is provided.

Water Recycling Act of 1991 (Water Code § 13575 et seq.)

This Act makes the following findings and declarations.

- The State is subject to periodic drought conditions;

- The development of traditional water resources in California has not kept pace with the State's population which is growing at the rate of over 700,000 per year and is anticipated to reach 36 million by the year 2010;
- There is a need for a reliable source of water for uses not related to the supply of potable water to protect investments in agriculture, green belts, recreation, to replenish groundwater basins, and to protect and enhance fisheries, wildlife habitat, and riparian areas;
- The environmental benefits of reclaimed water include a reduced demand for water in the Sacramento-San Joaquin Delta, reduced discharge of waste into the ocean, and the enhancement of groundwater basins, recreation, fisheries, and wetlands;
- The use of reclaimed water has proven to be safe, and the State DHS is updating regulations for its use;
- The use of reclaimed water is a cost-effective, reliable method of helping to meet California's water supply needs;
- The development of the reclaimed water infrastructure will provide jobs and enhance the economy of the state;
- Retail water suppliers and reclaimed water producers and wholesalers should promote the substitution of reclaimed water for potable and imported water in order to maximize the appropriate cost-effective use of reclaimed water in California;
- Reclaimed water producers, retail water suppliers, and entities responsible for groundwater replenishment should cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing reclaimed water service;
- Retail water suppliers and reclaimed water producers and wholesalers should be encouraged to enter into contracts to facilitate the service of reclaimed and potable water by the retail water suppliers in their service areas in the most efficient and cost-effective manner; and
- Reclaimed water producers and wholesalers and entities responsible for groundwater replenishment should be encouraged to enter into contracts to facilitate the use of reclaimed water for groundwater replenishment if reclaimed water is available and the authorities having jurisdiction approve its use.

Wholesale prices set by reclaimed water producers and reclaimed water wholesalers should reflect an equitable sharing of the costs and benefits associated with the development and use of reclaimed water.

Streambed Alteration Agreement

Sections 1601 and 1603 of the California Fish and Game Code require an agreement between the Department of Fish and Game and a public agency (1601) or private applicant (1603) proposing to substantially divert or obstruct the natural flow or effect changes to the bed, channel, or bank of any river, stream, or lake. The agreement is designed to protect the fish and wildlife values of a lake or stream.

Water Recycling Criteria

Under Title 22 of the California Code of Regulations § 60301 et seq., the California Department of Health Services (DHS) reviews and approves wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of reclaimed water for industrial processes such as steam production and cooling water. California Title 22 recognizes that there are different recycled water uses, and depending on the risk of human contact, different treatment standards are permissible. For industrial cooling, Title 22 recycled water needs to be at a minimum, disinfected secondary-23 (Most Probable Number of 23 coliform bacteria/100ml). For unrestricted use of recycled water, such as in a distribution network serving multiple users, tertiary treatment is required to meet a standard of 2.2 MPN/100 ml. Title 22 also regulates wastewater treatment system reliability, requiring a combination of redundant processes, back-up power supplies, and/or storage to provide high reliability.

STATE POLICIES

State Water Resources Control Board (SWRCB) Resolution 75-58

The SWRCB has adopted policies that provide guidelines for water quality protection. The principle policy of the SWRCB which specifically addresses the siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted by the Board on June 19, 1975 as Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should come from, in order of priority: wastewater being discharged to the ocean, ocean water, brackish water from natural sources or irrigation return flow, inland waste waters of low total dissolved solids, and other inland waters. This policy also includes cooling water discharge prohibitions such as land application.

SWRCB Resolution 77-1

State Water Resources Control Board Resolution 77-1 encourages and promotes reclaimed water use for non-potable purposes.

SWRCB Resolution 68-16

The SWRCB has adopted a policy for maintaining existing high quality waters to the maximum extent possible. The existing high water quality must be maintained until demonstrated to the State that any proposed change will be consistent with the maximum benefit to the people of the state and will not unreasonably affect present or future beneficial uses. Any activity which discharges a waste to existing high quality waters will be required to provide the best practicable treatment necessary to assure that pollution or nuisance will not occur and that the highest water quality, consistent with maximum benefit to the people of the State, will be maintained.

LOCAL

Sacramento County Land Grading and Erosion Control Ordinance

The purpose of the Sacramento County Land Grading and Erosion Control Ordinance is to minimize damage to surrounding properties and public rights-of-way; degradation of

water quality; disruption of natural drainage flows; sediment and pollutant runoff from construction related activities; and to comply with the provisions of the County's National Pollutant Discharge Elimination System (NPDES) Permit Number, CA0082597.

The County of Sacramento reviews grading plans on projects which would 1) grade, fill, excavate, store or dispose of 350 cubic yards or more of soil or earthy material or 2) clear and grub 1 acre or greater of land within the unincorporated area of the county. The ordinance requires grading plans prepared by a civil engineer be submitted for County review and approval showing the location of grading and disposal areas in relation to on-site and surrounding watercourses and wetlands, existing and proposed drainage systems, and drainage area boundaries and acreages.

Sacramento County Floodplain Management and Interim Floodplain Development Policies

The Sacramento County Floodplain Management and Interim Floodplain Development Policies establish requirements and guidelines for 1) minimizing and mitigating impacts of new development on floodplains in unincorporated Sacramento County and 2) guiding new development in or near floodplains. Those policies require new development to be located above the elevation of the 100-year floodplain, and establish guidelines and restrictions for floodplain development, encroachment and fill. The policies are administered by the County of Sacramento Public Works Agency, which also administers the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) for the unincorporated portion of Sacramento County.

ENVIRONMENTAL SETTING

PROJECT DESCRIPTION

The Cosumnes Power Plant would be a nominal 1,000-megawatt (MW) combined-cycle generating facility using natural gas-fired combustion turbines, steam turbines, and associated infrastructure. The CPP would be constructed in two phases of 500 MW. Each phase would consist of two combustion turbines, one condensing steam turbine, and two heat recovery steam generators. The project proposes to use water from the Folsom South Canal (FSC) for cooling (SMUD 2002r and SMUD 2002x). Additional CPP facilities consist of:

- approximately 26 miles of natural gas pipeline between the CPP and SMUD's existing pipelines at the Carson Ice-Gen Plant. See **Project Description Figure 4** for the preferred pipeline alignment;
- a 230-kilovolt (kV) switchyard;
- approximately 0.4-mile-long 230-kv transmission line from the new switchyard to the existing Rancho Seco Plant switchyard;
- a new 0.4-mile pipeline connecting CPP to the existing 66-inch diameter underground water pipeline that currently serves the Rancho Seco Plant. The water would come from the FSC;

- a package treatment plant to provide domestic water by treating surface water from the FSC pipeline;
- a 24-foot wide construction access road constructed east of the Rancho Seco Plant (SMUD 2002p, Section 1.2);
- a zero-liquid discharge (ZLD) system designed to process plant wastewater; and
- wet cooling towers.

The CPP proposes to use an average of 5,326 acre-feet of water per year (AFY) and a maximum of 8,062 AFY of FSC water.

SITE AND VICINITY DESCRIPTION

SMUD proposes to build the CPP in Sacramento County, 25 miles southeast of the city of Sacramento. The CPP would be located on approximately 30 acres of a 2,480-acre area owned by SMUD on which the Rancho Seco Nuclear Power Plant (RSP) is also located. The site is located approximately 4 miles north of San Joaquin County and 5 miles west of Amador County.

The CPP site is in a rural area dominated by grazing, vineyards and scattered rural homes. The Sierra Nevada foothills are located approximately 15 miles to the east. The project site slopes gently from south to north, but is otherwise flat. Site elevation ranges from 140 to 160 feet above mean sea level. According to the AFC, annual precipitation at the project site is about 12 inches per year. Normally, 89 percent of Sacramento valley rainfall occurs between November and April. Daytime temperatures during summer months range from between 80°F and 100°F, with peak days reaching as high as 110°F. The temperature at Sacramento ranges from an average minimum of 39.5 degrees in January to an average maximum of 91.4 degrees in July (SMUD 2001a, section 8.14.3).

SOILS

Soils on the project site are classified as Redding gravelly loam and Corning Complex. Redding gravelly loam is located on approximately 90 percent of the project site. Redding series soils are moderately deep, well or moderately well drained soils derived from alluvium from mixed sources. Water erosion potential is slight to moderate, with a slow to medium runoff rate. Revegetation potential is fair. The soils occur on nearly level to gently sloping surfaces.

Corning soils are very deep, well or moderately well drained soils formed in gravelly alluvium from weathered mixed rock sources. Corning soils are on high terraces with mound, intermound microrelief. Water erosion hazard is moderate to severe, with a medium runoff rate. Revegetation potential is fair.

The proposed gas pipeline will cross a series of soils with slight to moderate water erosion hazard, slow to medium runoff rate, and fair to good revegetation potential. Table 8.9-2A of the AFC summarizes those soil characteristics (SMUD 2001a).

SURFACE WATER

The primary rivers in Sacramento County are the Sacramento, American, and Cosumnes Rivers. The Sacramento River flows from north to south along the western boundary of Sacramento County before ultimately discharging into the San Francisco Bay-Delta. The American and Cosumnes rivers flow east to west from the Sierra Nevada Mountains. The American River is the larger of those two rivers and its flow is regulated by Folsom Reservoir located in northeastern Sacramento County. The Cosumnes River watershed is largely unregulated and in most years, the downstream flows are intermittent with no flow occurring in the summer months. The proposed project site is within the Cosumnes River watershed. The Folsom South Canal and Rancho Seco Reservoir are the major surface water features in the vicinity of the project site.

Cosumnes River

The Cosumnes River is the last large undammed river in the Central Valley, flowing at up to 54,000 cubic feet per second (cfs) during storm events. The Cosumnes River channel is natural, meandering, and bordered by riparian vegetation on both sides. USGS Water Resources data show that the Cosumnes River runs dry at McConnel Gage during the summer months, likely influenced by surface diversion and groundwater pumping.

The Cosumnes River flows into the Mokelumne River, which joins the Sacramento-San Joaquin Delta near Antioch. Beneficial uses of this river system include water supply, recreation, aesthetics, groundwater recharge, freshwater replenishment, and fish, wildlife, and aquatic habitat.

Folsom South Canal

The Folsom South Canal (FSC) is located approximately 3.5 miles west of the project site. The FSC is a 26.98-mile conveyance owned and operated by the U.S. Bureau of Reclamation (USBR) as part of its Central Valley Project (CVP). The canal operates at less than 1 percent of its hydraulic capacity and runs generally north to south from Lake Natoma on the American River in eastern Sacramento County and ends just south of the RSP. SMUD is currently the primary user of this facility, and pumps water from the canal to the RSP and Rancho Seco Reservoir. SMUD has a USBR water service contract for the delivery of a maximum of 75,000 acre-feet per year (AFY). Of this water, 15,000 AFY of water is allocated to be used at the Rancho Seco Power Plant site. SMUD's staff has stated that the 15,000 AFY would cover both the existing Rancho Seco Plant site water needs and the CPP water needs without an increase over the 15,000 AFY. Arden Cordova Water District takes up to 5,000 AFY from the canal (SMUD 2001a and SMUD 2002r). SMUD recently agreed to a five-year temporary assignment of 5,000 AFY of CVP water rights to Arden Cordova Water District.

Rancho Seco Reservoir

Rancho Seco Reservoir is located approximately one mile east and upstream of the CPP site and is constructed on an unnamed tributary to Clay Creek. The majority of the water for the Rancho Seco Reservoir comes from the FSC, and a minor amount comes from the small 1.8 square mile watershed in which the site is located.

The surface area of Rancho Seco Reservoir is approximately 165-acres and is contained by an earthen dam constructed in 1972. Reservoir storage capacity is 2,850 acre-feet (SMUD 2002a). Water is regularly discharged from the Rancho Seco Reservoir to maintain high quality water for recreational users, and to maintain riparian vegetation downstream of the dam. Rancho Seco Reservoir was originally developed to provide an emergency backup water supply for the RSP and to provide water for fire control. In 1992, SMUD agreed to operate Rancho Seco Reservoir as a public park for 50 years. The park is open to the public year round for swimming, fishing, and camping (SMUD 2001a).

Clay Creek, Hadselville Creek, and Laguna Creek

Clay Creek, adjacent to the CPP site, is an ephemeral stream with a watershed area of approximately 4.6 square miles. Clay Creek flows from east to west, approximately 0.1 mile north of the project site and has been diverted and altered as a result of mining, Rancho Seco Reservoir, and construction of the RSP. Because of mine tailings, the creek divides into two braids (branches) approximately 400 feet east of the project site. The north braid crosses from east to west approximately 400 feet north of the CPP site. The south braid crosses the northeast corner of the project site. Approximately 2.3 acres of the 30-acre CPP site are situated between the north and south braids of Clay Creek.

Perennial flow in Clay Creek originates west of the project site where wastewater from the RSP discharges into the creek at a rate of about 13 million gallons per day (MGD) and combines with stormwater and irrigation runoff. Clay Creek flows into Hadselville Creek approximately two miles west of the project site. Hadselville Creek flows into Laguna Creek which flows into the Cosumnes River approximately nine miles downstream of the Laguna Creek/Hadselville Creek confluence (SMUD 2001a).

GROUNDWATER

Regional Groundwater

The site is found in the Pliocene Laguna Formation and is underlain by 1,500 to 2,000 feet of Tertiary or older sediments which were deposited on a basement complex of granitic to metamorphic rocks. Groundwater in the area is present under free or semi-confined conditions as a part of the Sacramento Valley groundwater basin, which stores water primarily in the Mehrten Formation. The sand and gravel zones of this formation are heavily used in Sacramento County to provide 58 to 60 percent of the regional water supply. There is also a deep groundwater aquifer at a depth of 800 to 1000 ft in the Mehrten formation, which is separated from the shallow aquifer by a discontinuous clay layer. The water quality in the deep aquifer is generally not as good as that of the shallow aquifer, with higher concentrations of TDS, iron, arsenic, radon, and manganese (SMUD 2001a).

Site Groundwater

Although there has been an approximate 20-foot decline in the Rancho Seco Plant site's groundwater level from 1990 to the present, the groundwater level and quality at the CPP site are relatively stable and have been largely unaffected by overdrafts in other Sacramento County areas (Sacramento County Water Agency 1997).

Groundwater quality at the site is generally good and within federal and state limits for drinking water. Water is sodium bicarbonate type with low total dissolved solids (<200 mg/L), hardness less than 50 mg/L and iron and manganese less than 0.3 mg/L. There are no reports of contamination or other water quality problems at the site.

Groundwater contamination is unlikely because of a lack of urbanization east of the site (up gradient) and poor soil permeability that effectively prevents substantial migration of contaminants. Beneficial uses of groundwater underlying the project site are municipal, industrial, and agricultural supply.

PROJECT WATER SOURCES

Cooling Water Source

Fresh water for cooling water make-up would be supplied from the FSC with the Rancho Seco Reservoir providing short-term storage for canal water pumped by an existing Rancho Seco pump station and pipeline. Water quality is known to change significantly during canal passage and may change further in the reservoir.

Folsom South Canal/Rancho Seco Reservoir

The FSC withdraws about 27 to 30 cfs year-around from the American River at Nimbus Dam. The USBR operating data indicates a seasonal range of 0 to 50 cfs (32 cfs average) for water released from Nimbus Dam into the canal.

EBMUD's study of FSC water quality shows that canal TDS and other parameters change when there is sufficient groundwater inflow. This condition occurred in two of the three years (1998 and 1999) studied by EBMUD. Water quality data taken at five points along the canal show that FSC water quality degrades as the distance from the American River increases.

Soil and Water Resources Table 1 summarizes the average changes in FSC water quality.

**Soil and Water Resources Table 1
Average Folsom South Canal Water Quality**

<i>Average Parameter (ppm)</i>	<i>Nimbus Dam</i>	<i>SMUD Pump Station</i>	<i>Change</i>
Turbidity (NTU)	2.8	0.7	-75 percent
TDS	44	47	+ 7 percent
Alkalinity	21	28	+33 percent
Hardness	19	25	+31 percent
Calcium	5.1	7.5	+48 percent
Sodium	2.1	2.8	+31 percent
Ammonia	0.013	0.024	+85 percent
Chlorophyll A	0.0028	0.0049	+75 percent
Total Organic Carbon	1.5	3.1	+107 percent
Trihalomethanes	0.059	0.076	+29 percent

Source: EBMUD American River Water Quality Monitoring Program Summary, July 2 1977 to Feb 26, 2001.

East Bay Municipal Utility District

East Bay Municipal Utility District is entitled to take up to 150,000 AFY from the American River based on a 1970 contract with the USBR. Although this right was challenged in 1972, a 1990 court ruling known as the Hodge Decision affirmed EBMUD's right to CVP water from the FSC provided that minimum American River flows are maintained. On January 30, 2001, EBMUD, the City of Sacramento, and the USBR agreed to jointly pursue the development of a 133,000 AFY Sacramento River diversion about a mile north of the town of Freeport. EBMUD's Freeport diversion water would be pumped east to the FSC via a buried pipeline where the diverted water would co-mingle with existing FSC water and travel south past the Rancho Seco pump station to the end of the FSC. From there, a new EBMUD pipeline would carry the flow to EBMUD's Mokelumne Aqueducts. If approved and built, this diverted Sacramento River water, which is of lower quality, would degrade the FSC water quality, which would lower the quality of the water used at CPP.

Potable Water Source

Potable water for domestic CPP purposes would be provided by treating Folsom South Canal water with a package treatment plant, such as US Filter Water Boy® or Actiflo® or equivalent process, followed by an ultrafiltration process that would also supply the reverse osmosis system for the steam make-up cycle. Total potable water proposed for domestic use is estimated to be less than 2 AFY (SMUD 2001a).

Back-up Water Source

The CPP project would have five million gallons (15.35 acre feet) of active storage in two on-site storage tanks, which would supply water during a short-term peak demand or a water supply interruption. Rancho Seco Reservoir contains 2,850 acre-feet, and already provides diurnal storage as it receives water from the Rancho Seco pump station and releases it on a continuous basis for Rancho Seco use. If used as a backup water supply for CPP, the reservoir drawdown would be about two inches in two days, which neither SMUD nor Energy Commission staff consider disruptive (SMUD 2001a). Additional short-term peak and back-up supply could likely be provided by additional reservoir drawdown or by the drawdown of FSC. The FSC drawdown curve should be similar to that of the reservoir.

PROJECT RELATED IMPACTS

DIRECT AND INDIRECT IMPACTS

SOILS

Erosion Control and Stormwater Management

During construction of the CPP, approximately 50 acres of land would be cleared of vegetation, graded, and leveled. Removal of the vegetative cover by grading would increase the potential for wind and water erosion of the affected soils. This exposure may cause potential erosion and sediment runoff, resulting in adverse impacts to surface waters downstream of the project (SMUD 2001a).

CPP Site Erosion and Sedimentation

The proposed site is characterized by features prone to erosion. As the slope inclination increases, the intensity of erosion increases proportionately. Wind erosion of soils in a natural setting is expected to be slight due to the presence of a grass cover over the site. Removal of this vegetative cover by grading would increase the potential for wind erosion depending on wind velocity and soil moisture content. The susceptibility of the bare soils to water erosion ranges from slight to severe (SMUD 2002u). These potential erosion impacts can be mitigated by using Best Management Practices (BMP).

Clay Creek is an ephemeral stream with a watershed area of approximately 4.6 square miles. Clay Creek is located adjacent to the CPP site and splits into two courses (braids) near the site with the south braid crossing a corner of the proposed CPP site. CPP construction would result in the diversion of the south braid of Clay Creek. Additionally, two unnamed Clay Creek tributaries enter the project from the south. The east tributary would be diverted around the site. The west tributary would be allowed to flow into the proposed switchyard area (SMUD 2002aa).

SMUD performed a 100-year hydraulic analysis of Clay Creek adjacent to the project site which showed that approximately 15 percent of the CPP site (approximately 3.8 acres) is within the 100-year floodplain. This flood-prone area roughly corresponds to the triangular area at the northeast corner of the site between the north and south braids of Clay Creek as show on Figure W&S-250a of Data Response 245. Based on the hydrologic study performed by SMUD, the 100-year peak discharge on Clay Creek is estimated to be 1,840 cfs (**Soil and Water Resources Table 2**) (SMUD 2002s).

The diversion of Clay Creek and the unnamed tributary would expose the CPP site and the rerouted stream channel to erosion. Potential impacts include:

- damage to the CPP site and facilities during construction and operation;
- increased turbidity of stream flows through transport of the eroded material;
- sediment deposition downstream of the site; and
- the formation of two new stream channels in areas that could be unstable when subject to concentrated water flow.

These impacts can be mitigated by installing erosion protection in the form of planted vegetation or non-erodible lining (such as riprap) at appropriate locations where flow velocities are expected to be erosive.

SMUD is required under Section 402 of the Clean Water Act to comply with the statewide General National Pollutant Discharge Elimination System (NPDES) Permit for stormwater discharges associated with construction activity. Soil disturbances during construction are expected to result in short-term increases in water and wind erosion.

Soil and Water Resources Table 2
Peak Discharge Rates on Clay Creek at the CPP Site

<i>Flood Return Period, in Years</i>	<i>Peak Discharge Rate, in cfs</i>
2	300
5	580
10	790
25	1,220
50	1,500
100	1,840

Note: These discharges are estimated using a regional regression equation and could be modified by more detailed, site-specific analysis. Discharges for all return periods except the 100-year were estimated by Staff.

Project design and the Storm Water Pollution Prevention Plan (SWPPP) would include measures to stabilize cut and fill slopes and to control drainage and erosion. SMUD has provided a draft SWPPP that identifies potential temporary and permanent Best Management Practices to prevent soil erosion and sediments from affecting surface water. Implementing BMPs identified in an approved SWPPP would keep impacts from erosion and sedimentation impacts at less than significant levels.

CPP Linear Facilities Erosion and Sedimentation

Temporary disturbances related to construction of the gas and water pipelines are expected to occur but would be minimal and short-term. Construction would include trenching for installation of approximately 26 miles of gas pipeline, and a 0.4-mile water line, as well as construction of a transmission line and access roads.

Construction of the pipelines would require crossing rivers, creeks, irrigation canals, riparian areas, vernal pools, and other ditches. SMUD proposes to use horizontal directional drilling (HDD) for ten of the crossings including the Cosumnes River, Badger Creek, and a small lake approximately 0.5 miles southeast of the Badger Creek crossing. HDD involves drilling from the ground surface adjacent to a stream or water body using a technique that guides the direction of the drill to pass under the stream and emerge on the ground surface on the opposite side without disturbing the streambed. Staging areas are required at the entry and exit points of the drill.

HDD is used to eliminate disturbance to water courses and wet areas. There are however, potential water quality impacts associated with HDD. These potential impacts include occasional unintended fracturing of the ground above the drill, resulting in a pathway through which drilling mud discharges onto the ground surface or streambed. Although not generally toxic, the drilling mud can cause turbidity impacts or coat streambed surfaces to the detriment of aquatic life. These “frac-outs” can sometimes be difficult to detect, particularly in streams with flowing water.

Stream crossings where HDD would not be used would be crossed by open trench. Potential construction-related impacts of an open trench crossing include 1) increased sediment delivery to the stream flow through disturbance of the channel bed and banks during construction, 2) destabilization of the channel bed and banks resulting in long-

term erosion, and 3) introduction of foreign contaminants through the use of heavy machinery in the streambed. Open trenching impacts can be avoided by the use of erosion-control BMPs. Other BMPs specific to trenched stream crossings include construction in the dry season, diversion of stream flows around the active excavation area through the use of coffer dams, installation of temporary culverted crossings for heavy equipment, and regular maintenance and inspection of heavy equipment used in the stream channel to minimize the introduction of foreign pollutants. Following construction, permanent BMPs would be implemented at laydown areas and along linear routes.

Natural stream channels and banks are typically subject to scour of the bed and banks during flood flows. Bed scour is usually not visible because it occurs during a flood and ceases as the flood subsides. Bank erosion is more evident because the effects can be seen well after the flood. Pipelines buried below and adjacent to active stream channels can be uncovered and exposed by bank erosion or streambed scour. Exposure of the pipeline could result in pipeline rupture through the action of flowing water and debris, or through third party action after the exposure has occurred. Rupture of the gas pipeline could result in water contamination or fire hazard.

The potential for exposure of the pipeline by stream erosion and scour can be minimized by locating the pipeline below the expected 100-year depth of scour at stream crossings and extending this depth of burial a sufficient distance away from the streambed to avoid anticipated lateral erosion.

Trenching for pipeline installation and vehicular travel within the construction right-of-way would temporarily disturb soils and potentially increase wind and water erosion. However, appropriate erosion and fugitive dust control measures would be implemented during construction, therefore, no significant soil impacts are expected. SMUD has provided a draft SWPPP that identifies potential temporary and permanent Best Management Practices (BMPs) to prevent soil erosion and sediments from affecting surface water. Implementation of the measures set forth in the SWPPP would keep impacts from erosion and sedimentation to less than significant levels.

SPILL PREVENTION

There would be a variety of chemicals stored and used during construction and operation of the CPP project. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in storage tanks, and other chemicals would be stored in returnable delivery containers. Chemical storage and chemical use areas would be designed to contain leaks and spills. Drains would collect spillage, tank overflows, effluent from maintenance operations, and liquid from area washdowns. Effluent from chemical use area drains would be collected and treated on-site. Hazardous wastes would be stored in appropriately segregated storage areas surrounded by berms to contain leaks and spills. The bermed areas would be sized to hold 150 percent of the contents of the largest single container and, if not covered, sized for the larger of 150 percent of the largest single container and a 25-year, 24-hour rainfall (SMUD 2001a). These BMPs would safeguard groundwater and downstream surface water from impacts due to chemical spills on the CPP site.

STORMWATER RUNOFF

CPP Site Stormwater Control

Approximately 15 percent of the CPP project would be located in an area that is now subject to 100-year flooding by Clay Creek. The flood-prone area is in the northeast corner of the site.

SMUD proposes to fill the area located in the Clay Creek 100-year floodplain to an elevation above the 100-year flood level in conformance with Sacramento County standards. Filling this area is intended to divert the south braid of Clay Creek around the property, remove the northeast corner of the site from the Clay Creek floodplain, and prevent 100-year flooding of the CPP site and facilities listed above (SMUD 2002k).

SMUD has provided the results of an engineering analysis that demonstrates the proposed graded CPP elevation would be at or above the existing 100-year water surface elevation, but has not provided an engineering analysis sufficient to support a conclusion that the proposed site would be at an elevation above the encroached 100-year floodplain. With the power plant site elevated to a level that avoids flooding, the flood area becomes smaller and the flood elevation can rise. This is called encroachment.

Floodplain encroachments typically result in higher water surface levels than in the natural condition. This can have adverse effects on adjacent property. Because of the location of the CPP within SMUD property, Clay Creek encroachment impacts would be entirely on SMUD property in an area where there are no existing structures potentially subject to flood damage. SMUD has indicated that it intends to create additional conveyance for encroached Clay Creek flows, but has not provided engineering analysis to show the effect of the encroachment nor the nature of the increased conveyance. SMUD needs to provide an encroachment analysis and design information of proposed Clay Creek conveyance features in order for staff to complete the CPP project Final Staff Assessment.

Stormwater Detention Basin

The initial SMUD proposed CPP project included a detention basin. SMUD's July 18, 2002 AFC Supplement C submittal removes the detention basin from the proposed CPP project.

Soil and Water Resources Table 3 provides preliminary post-development runoff volume and peak discharge information computed by staff using the coefficients and methodology used by SMUD. Construction of the CPP would result in an increase of approximately 235 percent in the peak discharge rate and runoff volume generated by the site. SMUD needs to provide more information regarding the design of the stormwater runoff system proposed in order for staff to complete the CPP Final Staff Assessment. However, BMPs would likely mitigate potential erosion impacts.

Diversion of Tributaries

SMUD proposes to divert the east unnamed tributary around the CPP site by intercepting the flow at the south property line and conveying this flow directly east (a 90-degree turn) to be discharged into a graded swale that would lead to Clay Creek

within SMUD property but outside the CPP site. There are no structures or other improvements in the probable path of the diverted flood flows.

Soil and Water Resources Table 3
Preliminary With-Project Peak Discharge Rates and Flood Volumes
for the CPP Site

<i>Flood Return Period, in Years</i>	<i>Total Runoff from Site for 24-Hour Storm, in Acre-feet</i>	<i>Peak Discharge Rate Using Rational Method, in cfs</i>
2	2.3	26
5	3.3	35
10	3.8	40
25	4.4	47
50	4.9	54
100	5.4	56

Source: SMUD 2002ae.

Staff believes the proposed diversion of the east tributary flows is feasible, but SMUD has not provided staff with engineering analysis sufficient to demonstrate how the diversion will function. There is a potential for flood and water quality damage to the CPP site and downstream of the site if the flow diversion is inadequate. In order to do a thorough assessment of the CPP, staff needs plans that demonstrate the proposed diversion and conveyance structure are adequate.

Based on information provided in Informal Data Response Set 2, the west tributary would not be diverted. This drainage will flow down its current course through the proposed switchyard (SMUD 2002z). SMUD has not provided adequate information regarding the limits and depths of flooding through the switchyard area for staff to complete an assessment. There is a potential for significant flood damage resulting from the passage of this flow through the CPP site that cannot be evaluated with the information provided. In order to complete the Final Staff Assessment, staff also needs a map of the west tributary floodplain through the CPP property that demonstrates how flood impacts would be avoided, provided satisfactory BMPs are implemented. However, staff does not expect significant impacts.

CPP Linear Facilities Stormwater Control

The project would include a 26-mile gas pipeline that would cross 37 water channels, irrigation canals, riparian areas, vernal pools, and ditches. There would be two crossings of the Cosumnes River (one under the main channel and one under the overflow channel), one of Badger Creek, one of Laguna Creek, one of a tributary to Willow Creek, and one small lake. The rest of the wet area or stream crossings are ephemeral streams, seasonal wetlands, or ditches.

A new water line is proposed to convey cooling water from the RSP to the CPP. This water line would cross Clay Creek adjacent to the CPP site. Since the water line and gas line would be buried, no long-term stormwater related impacts are expected. Minor construction-related stormwater impacts are possible for those crossings that would be

installed by open trench. The impacts could result from diversions of flows during the crossings or by temporary stockpiles of excavated material. Those impacts would likely be minor and can be avoided by construction in the dry season.

Other linear facilities include transmission lines and a construction access road proposed east of the RSP. This road would begin at the existing access road to the Rancho Seco Reservoir and run due south to connect with Clay East Road at a point approximately one half mile east of the CPP site. The road will be 24 feet wide and constructed of asphaltic concrete on a raised gravel base. Culverts are proposed to convey water from the three local ephemeral drainages (SMUD 2002p, Section 1.2). The transmission line would cross Clay Creek, but towers would be constructed on either side of the road, resulting in no anticipated stormwater related impact. With the use of appropriate BMPs as set forth in an approved SWPPPs (Condition of Certification **Soil&Water 1 and 3**), stormwater related impacts of the proposed linear facilities are expected to be insignificant.

GROUNDWATER

No groundwater will be used for the proposed CPP project. Groundwater quality at the site is generally good and within federal and state limits for drinking water. Water is sodium bicarbonate type with low total dissolved solids (<200 mg/L), hardness less than 50 mg/L and iron and manganese less than 0.3 mg/L. There are no reports of contamination or other water quality problems at the site. Groundwater contamination is unlikely because of the lack of urbanization east of the site (upgradient) and poor soil permeability effectively preventing substantial migration of contaminants. There would be no subsurface discharge from the project and there would be secondary containment of any spilled materials. Therefore, there is little potential for the CPP to cause or contribute to groundwater resources impacts.

PROJECT WATER SUPPLY

SMUD proposes to use a ZLD system for both Phase 1 and 2, which would result in an average water use of 5,326 AFY, with a maximum demand as high as 8,062 AFY. The water would come from the FSC. During average operation, about 95.6 percent of the total water requirements are for cooling water. Non-cooling water is used for potable water within the plant, such as for drinking water and safety showers, as well as for fire suppression, washdown, and steam cycle make-up. CPP water supply would be provided under the terms of a 1970 USBR water supply contract for the delivery of up to 60,000 AFY of Central Valley Project (CVP) Water and approximately 15,000 AFY of Assigned Water from the City of Sacramento (USBR Contact No. 14-06-200-5198A). SMUD currently uses approximately 15,000 AFY from the FSC at the Rancho Seco Plant site and that amount would also adequately cover the CPP. A draft renewal contract (dated August 6, 2001) proposes to assign 30,000 AFY of SMUD's CVP water rights to Sacramento County Water Agency.

Soil and Water Resources Table 4 summarizes staff's estimate of the proposed CPP water use with a ZLD system.

Soil and Water Resources Table 5 compares the estimated quality of water sources, as well as EPA's drinking water standards.

In order to reduce the volume of high quality surface water from FSC used for the CPP project, SMUD proposes to use a ZLD system for Phase 1 and 2. SMUD would also submit a proposal for alternative water sources (such as reclaimed water) and/or other cooling technologies (such as hybrid cooling) for use in the Phase 2 portion of the CPP project. Staff has not received SMUD's proposal at this writing.

**Soil and Water Resources Table 4
Estimated CPP Water Demand and Parameters**

Estimated CWT Water Demand and Parameters		
Non-cooling and Cooling Water Source	Folsom South Canal/Rancho Seco Reservoir	
Estimated TDS	100(mg/L) (a)	
Dissolved Silica	12 (mg/L)	
Cooling Tower Target Cycles of Concentration	12	
<i>Wastewater Discharge</i>	<i>Zero Liquid Discharge</i>	
<i><u>Parameter</u></i>	<i>Average</i>	<i>Maximum</i>
Non-Cooling Make-up	147(gpm)	365(gpm)
Cooling Make-up (gpm)	3,147(gpm)	4,633(gpm)
Total Make-up Flow (gpm)	3,302(gpm)	4,998(gpm)
“ “ “	5,326(AFY)	8,062(AFY)
Surface Water Discharge (gpm)	0	0
Supplemental Dilution Water	None	
a) Estimated Rancho Seco Reservoir effluent. (Sacramento River water diverted by Freeport Diversion project is anticipated to have an equivalent TDS)		

ZLD Proposal

The primary equipment in the proposed ZLD system includes a brine concentrator, crystallizer, and distillate and brine holding tanks (SMUD 2002aa, p. ii). As water is circulated through the proposed wet cooling towers, a portion would be lost to evaporation and drift with a portion 'blown down' (purged) to maintain constituents in the cooling loop at a desired equilibrium concentration. In a ZLD system, nearly all of the water in this 'blow-down' stream is recovered as high quality permeate and distillate streams and reused in the cooling tower.

Raw water quality influences the number of times that cooling water can be practically concentrated and the amount of ZLD salt cake to be disposed at an appropriate landfill. With ZLD there is no wastewater discharge, and cooling tower blow-down can be further concentrated by increasing the number of cooling water cycles. Increasing cooling cycles and re-using the permeate and distillate streams significantly reduces the amount of make-up water.

SMUD proposes two parallel ZLD systems, one for each phase, with the systems interconnected for process redundancy.

Soil and Water Resources Table 5
Estimated Quality of Applicable Water Sources

<i>Selected Average Parameter (ppm)</i>	<i>FSC / Rancho Seco Reservoir</i>	<i>Sacramento River</i>	<i>Regional Ground- water 3)</i>	<i>US EPA Drinking Water MCL</i>	<i>Estimated Reclaimed Water</i>
TDS	100	110 (5)	200	500	450
Hardness	26 (4)	55 (4)	95	250	-
Turbidity (NTU) /Suspended Solids	0.7 (4)	27.3 (4)	-	0.5	10
Dissolved Silica	12	16 (2)	-	-	16
Iron	0.04	0.6 (2)	2	0.3	-
Manganese	<.01	0.5 (2)	0.3	0.05	-
Arsenic	<0.002		.005 to .036	0.01	-
Radon, pCi/l	<0.001		100 to 779	300	-
Coliform (MPN/100ml)	69 (4)	359 (4)	-	200	<23
Total Organic Carbon	3.1 (4)	3 (5)	-	2	N/A
Mercury, Total (ng/L)	2.13	7.7 (2)	-	2.0	-

1) Operational Statistics Report, 1999-2000, City of Sacramento

2) 1999-2000 Annual Monitoring Report of the Sacramento River Watershed Program

3) Regional Water Master Plan, American River Basin Cooperating Agencies

4) Rancho Seco Pump Station, EBMUD American River Water Quality Monitoring Program

5) Sacramento River ambient average, at Freeport & RM44, Sacramento County Regional Sanitation District

ALTERNATIVE WATER SUPPLIES

SMUD proposes to use high quality surface water for cooling tower make-up. The quality of the proposed water source (FSC) is higher than needed for power plant cooling. Staff believes that lower quality reclaimed water is available and that the use of FSC water, as proposed in the AFC, is wasteful of high quality water. Staff analyzed the feasibility of alternate cooling water sources, water conservation measures, and alternate cooling technologies such as dry and hybrid cooling. Please refer to **Appendix A** of this Preliminary Staff Assessment (to be sent under separate cover) for a complete discussion of alternatives. SMUD has been receptive to the idea of water conservation and has proposed to use a ZLD system to conserve water, and is planning to make a proposal for the Phase 2 portion of the CPP project that would include the use of reclaimed water (SMUD 2002ad).

SMUD has held discussions with Sacramento County Regional Sanitation District (SCRSD), City of Galt, and City of Lodi regarding the use of reclaimed water at the CPP. There have also been discussions regarding ways to reduce or offset freshwater use by recharging groundwater using a recycled water source, or by replacement of freshwater used elsewhere for projects within the county with recycled water. SMUD

has committed to further study of these options, with the commitment that an option would be proposed for the Phase 2 portion of the project (SMUD 2002ad).

Recycled Water Supply Options

The use of reclaimed water from any source would eliminate the amount of proposed fresh inland surface water used for power plant cooling. Title 22 of the California Code of Regulations recognizes four standards for reclaimed water, based on the risk of human contact. Different treatment processes are commonly used to achieve each level. The four Title 22 standards are;

- undisinfected secondary;
- disinfected secondary-23 (23MPN/100ml);
- disinfected secondary-2.2 (2.2 MPN/100ml); and
- disinfected tertiary.

(Note: Most Probable Number, or MPN of 23 coliform bacteria/100ml)

These regulations recognize that industrial cooling has a minimal risk of human contact, and therefore sets lower coliform bacteria and turbidity standards than for unrestricted use.

For industrial cooling, reclaimed water needs to be disinfected secondary-23, which is now available at all 3 of the municipal wastewater sources considered. Both a drift eliminator and biocide systems are included in the proposed CPP project, so the use of reclaimed water would not require additional equipment at the CPP site.

Staff analyzed three waste treatment facilities capable of providing reclaimed water. See **Appendix A** for more information (to be sent under separate cover). Together, both phases of the CPP project would require 4.8 million gallons per day (MGD) to 7.2 MGD of water.

Sacramento Regional Wastewater Treatment Plant

The Sacramento County Regional Sanitation District's Regional Wastewater Treatment Plant (SRWTP) is located approximately 26 miles northwest of the proposed CPP and has 180 MGD of available disinfected secondary effluent and has expressed a strong interest to work with SMUD to facilitate recycled water use. In March of 2002, SMUD and SRWTP discussed the possibility of installing a reclaimed water pipeline in a common trench with the gas line as a means of reducing the cost of the reclaimed water pipeline.

A reclaimed water pipeline between CPP and SRWTP would parallel the proposed gas pipeline route to the CPP site. This would not eliminate the Clay Creek crossing of the proposed water supply line from the Rancho Seco Plant to the CPP, since this line would still be required for back-up water. Soil and surface water impacts could be adequately mitigated using appropriate standard BMPs for the CPP.

City of Lodi White Slough Water Pollution Control Facility

The City of Lodi's White Slough Water Pollution Control Facility (WSWPCF) is located approximately 30 miles southwest of the proposed CPP. Lodi averages 6.2 to 6.5 MGD

(8.5 MGD max) of secondary treated reclaimed water, and their renewed NPDES permit calls for 6.4 MGD of tertiary capacity by 2005. This alternative would require approximately 30 miles of pipeline, crossing many watercourses including Paddy Creek (three branches), the Mokelumne River, Dry Creek, and Skunk Creek. Soil and surface water impacts could be adequately mitigated using appropriate standard BMPs for the CPP.

City of Galt Wastewater Treatment Plant

The City of Galt Wastewater Treatment Plant is located approximately 12 miles southwest of the proposed CPP. Galt currently produces an average of 2.1 MGD of secondary effluent, which will increase to 3 MGD when their urban growth plan is achieved in about 2008. Additional effluent flow increases would depend on the population served. Galt currently has more than 30 days of effluent storage available, which would help to fully utilize the effluent and better meet peak demands. Galt's current flow is sufficient for one phase of the proposed CPP, but the average flow of 3 MGD would provide only about 64 percent of the water needs for both phases of the proposed CPP using ZLD.

This alternative would require three water crossings: Laguna Creek, Willow Creek, and a tributary to Laguna Creek. Soil and surface water impacts could be adequately mitigated using standard BMPs.

Reclaimed Stormwater

Stormwater is collected prior to discharge. Stormwater must be of high quality in order to be discharged to surface waters. The high quality of water required for surface discharge is likely higher than any of the candidate water sources. The applicant could capture and reuse collected stormwater as a part of the ZLD proposal. This requires a very low investment and would directly save about one-half percent of the annual water demand and would also significantly reduce stormwater monitoring and permitting costs. This would have a positive effect on the region's water balance and eliminate the risk of degrading down-stream beneficial uses.

ALTERNATIVE COOLING PROCESSES

Concerns associated with the use of inland surface water for power plant cooling have led power plant designers to develop a range of alternate cooling systems that use less water. Several alternate cooling technologies are being increasingly used and are feasible and well proven. These alternate technologies are discussed in **Appendix A** (to be sent under separate cover). Staff has identified hybrid and dry cooling as the most viable alternative technologies to the proposed wet cooling towers for this site.

Hybrid Cooling

Hybrid cooling would involve modified cooling towers that combine wet and dry cooling technologies. Both 95/5 (95 percent wet/5 percent dry) and 50/50 (50 percent wet /50 percent dry) hybrid cooling configurations were evaluated.

The 95/5 Hybrid cooling option would employ two plume abatement cooling towers. Water use would be reduced by about five percent of that required for the proposed project. Soil and surface water impacts would be about the same as the proposed project. In addition to using five percent less water, 95/5 hybrid cooling would also reduce the visible plume.

The 50/50 Hybrid cooling option would employ a plume abatement cooling tower and a dry cooling tower. This alternative would require 50 percent less cooling water than the proposed project. Soil and surface water impacts would be slightly greater than that of the proposed project because a larger area of disturbance would be required.

Dry Cooling

In a dry cooling system, fans blow air over a radiator system to remove heat from the system via convective heat. There are two types of dry cooling systems available: direct dry cooling and the lesser used indirect dry cooling. For the CPP site, direct dry cooling (also called air-cooled condenser (ACC)) was analyzed.

ACC's would eliminate the proposed project's need for cooling water. Dry cooling would eliminate the use of American River water (FSC water) for power plant cooling. The applicant considered locating the ACCs on the south and north ends of the proposed site (SMUD 2001a). The ACCs would result in greater encroachment into the east braid of Clay Creek than the proposed project, further complicating the issues associated with creek diversion, flooding, and CWA 401/404 permitting. Although the soil and surface water impacts of dry cooling would be slightly greater than the proposed project, the implementation of appropriate standard BMPs, would reduce these impacts to less than significant.

BACK-UP WATER SUPPLY

In the case of a failure in the cooling water delivery system, the proposed CPP project would operate from two on-site tanks having an active storage volume of five million gallons (approximately one day of water supply). Rancho Seco Reservoir could provide a backup water supply for two days without significant disruption (about 2 inches) to the lake level. Additional back-up water would be available with further reservoir drawdown and with FSC drawdown. The Cooling Study (Appendix A) assumed that each phase would use 300 to 400 AFY of fresh water annually for back-up supply and for partially meeting short-term peak demand. No significant impacts are expected due to the use of backup water supplies.

CONSTRUCTION WATER SUPPLY

During construction approximately 3,000 gpd would be used for dust control on-site, and an additional 3,000 gpd on the linear facilities. Water for construction on-site would come from the SMUD's contracted water in the FSC, delivered from a hydrant at the RSP. Water for construction on the linear facilities would be from the same source or contracted from Sacramento County at a location more proximate to construction. No significant impacts are expected as a result of the use of construction water.

WASTEWATER

Waste water from sinks, toilets, showers, and facility equipment areas (area washdown) would be disposed of in a package wastewater treatment system and leach field in the central portion of the site adjacent to the administration building. No significant impacts are anticipated from these processes.

ANALYSIS OF CUMULATIVE IMPACTS

The proposed CPP site is located on the RSP site and is surrounded by rural agricultural lands. The following assesses the potential cumulative impacts of the proposed CPP.

Erosion Control and Stormwater Management

Construction and operation activities related to the proposed CPP may cause accelerated wind and water erosion. Implementation of the proposed mitigation measures would ensure that erosion and potential sedimentation is minimized. No significant cumulative impacts are anticipated.

Pollutant Spills

The proper use of secondary containment and the use of BMP's will reduce the risk of cumulative impacts from a pollutant spill to less than significant. No significant cumulative impacts are expected.

Stormwater Runoff

Stormwater runoff typically increases with industrialization and new construction activities. The proposed CPP will increase stormwater runoff locally but the site is not large enough to have a significant effect on the stormwater flows of Clay Creek or downstream rivers. Through the use of BMPs addressed in the SWPPP, no significant cumulative stormwater impacts are expected.

Groundwater

Groundwater is not proposed for use at the CPP. There is little potential for the CPP to cause or contribute to cumulative impacts to local groundwater quantity or quality.

Regional Water Supply

Water is a valuable commodity in California. The American River Water Resources Investigation (ARWRI) Planning Report projected a 24 percent increase in demand (57 percent urban increase, 14 percent agricultural decrease), or an increase of 187,000 AFY between 2000 to 2030. The report concludes that future needs cannot be met with current supplies and forecasts water supply shortage for the Sacramento area as soon as 2010. SMUD's proposal to use high quality surface water for cooling competes with the needs of growing commercial, urban, and residential needs for water. The water proposed for use at CPP would no longer be available for potable water use and lower American River in-stream flow. Staff considers the use of American River surface water for CPP cooling as contributing to the potential shortages in the region's water supply.

The ARWRI report indicates an available Sacramento County water supply of 802,700 AFY and projected a regional water supply shortfall of 49,000 AFY in 2010, 97,000 in 2020, and 174,500 AFY in 2030. The USBR and Sacramento Regional County Sanitation District (SRCSD) considered alternative sources of water supply and demand reduction options. They concluded that while reclaimed water would not be readily accepted as an alternate potable water source, it can be a supplemental supply for non-potable demands and can play a role in helping extend regional surface and groundwater supplies for potable use. The use of FSC freshwater represents a potential significant cumulative impact by reducing the freshwater supply available for other uses in the area. The proposed ZLD system saves a significant amount of fresh

water relative to the applicant's original proposal. However, additional fresh water can be saved by the use of other water supplies and/or alternate cooling processes. Staff expects the applicant to submit a proposal to further reduce the use of FSC freshwater for Phase 2.

Flooding

Flood discharges typically increase with industrialization and new construction. The proposed CPP project would contribute incrementally to this increase on the Cosumnes River watershed. Although staff needs additional information regarding flood potential/analysis, the preliminary determination is that by using appropriate BMPs, project-related flooding impacts would not be significant, nor will there be a significant cumulative impact from flooding.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than 50 percent within a six-mile radius of the proposed Cosumnes Power Plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment). However, as indicated in **Socioeconomics Figure 1**, there are multiple census blocks with greater than 50 percent minority persons within the six-mile radius; staff considers these to be pockets or clusters. Staff also reviewed Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Staff has not identified any significant impacts to soil or water resources within six miles of the plant site.

FACILITY CLOSURE

The CPP is expected to operate for a minimum of 30 years depending on its economical viability. An early decommissioning is also possible. Decommissioning may involve mothballing or removal of all equipment and appurtenant facilities.

The facility closure plan will be submitted to the Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans would be required. The plan would address all concerns regarding soil and water resources (SMUD 2001a).

COMPLIANCE WITH LORS

Staff anticipates that the CPP project can comply with all applicable LORS, however, at this writing staff does not have sufficient information to reach a final conclusion. The LORS that apply to the use of FSC water that are at issue include SWRCB policy 75-58, Article X Section 2 of the constitution, and the State Water Recycling Act (CWC 13575 et seq.). The applicant has proposed the use of a ZLD system for the CPP project, and is considering additional freshwater conservation options for the Phase 2 portion of the CPP. Final LORS compliance determination will be made following analysis of the applicants forthcoming ZLD and freshwater conservation proposal.

The applicant has not obtained a Streambed Alteration Agreement from the California Department of Fish and Game, nor have they received a CWA section 401, 402, or 404

permit. As appropriate, staff will require these and potentially other permits to be obtained and all permit requirements implemented as Conditions of Certification.

MITIGATION

APPLICANT PROPOSED MITIGATION

SMUD provided a draft Stormwater Pollution Prevention Plan that identifies temporary and permanent erosion control and stormwater BMPs. The draft SWPPP identified a number of potential Best Management Practices for the construction and operation of the CPP (SMUD 2001a). The practices identified are:

- temporary and permanent water diversion strategies;
- temporary and permanent vegetation strategies;
- use of soil stabilizers (i.e., water) as appropriate to minimize dust;
- installation of a sediment/retention basin to minimize off-site discharge of sediments;
- storm drain inlet protection to prevent sediment-laden runoff from entering inlets or catch basins;
- the use of silt fences, straw bale barriers, and fiber rolls to intercept sediment-laden runoff from disturbed soil;
- secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of liquid materials from contaminating soil or soaking into the ground;
- designated storage areas for construction wastes, hazardous materials, paints, and related products along with covered dumpsters and containers for waste and recyclables;
- training of employees on stormwater quality management;
- implementation of a spill prevention and control plan;
- timely removal of construction wastes;
- storage of all liquid wastes in covered containers;
- emergency spill containment kits and materials in areas of potential hazardous materials release; and
- routine maintenance of the oil/water separator system.

ENERGY COMMISSION STAFF PROPOSED MITIGATION

1. The applicant shall implement SWPPPs. Erosion control and stormwater management drawings need to accompany the narrative portion of the SWPPPs. Both the drawings and the narrative need to be detailed, specific, consistent, and include the following elements for the proposed CPP project:

- drawings/maps that show the topographic features of the proposed project including areas involving all proposed pipeline construction, the 20-acre laydown area, and stockpile location(s). The mapping scale should be 1"= 100' or less (1"=50' recommended). The drawings should depict the surrounding area (south and east of site) including the topography and existing features. The drawings should also show existing structures, drainage pipes, and diversion swale(s).
- a discussion of any soil use limitations associated with construction and revegetation, and any resolutions needed to assist the contractor in overcoming any specific soil characteristics limitation.
- a map/drawing that show the proposed contours tying in with existing ones. All proposed utilities including stormwater facilities should be shown on the plan drawings. All erosion and sedimentation control facilities should be shown on the maps. The drawings should contain a complete mapping symbols legend that identifies all existing and proposed features including the soil boundary(s) and a limit of construction. The limit of construction boundary should include the project facility, pipeline areas, stockpile areas and laydown areas. The limit of construction ensures all work is confined to the proposed CPP site in order to protect all surrounding areas not involved in construction or operation of the proposed project.
- a detailed and specific construction sequence that addresses the entire sequence of events from initial mobilization until final stabilization (e.g., vegetation/asphalt) is achieved.
- a description of how silt fences and hay bales will be installed on level grade and parallel to the existing contour. If the slope length to the silt fence and haybales exceeds 250 feet, other erosion and sediment control facilities should be used. Silt fence and haybales should be used to trap sediment and not as runoff conveyance or control facilities. Staff highly recommends that, during construction activities, the applicant consider temporarily converting the stormwater management basin into a sediment basin. The basin will need to be enlarged appropriately to account for sediment and stormwater storage. The basin must be sized adequately to contain the 100-year stormwater. All site and laydown runoff can be intercepted and diverted into the basin.
- a depiction of all site-specific BMPs proposed in the erosion and sediment control plan and the stormwater management plan and discussed in the narrative. The details of each BMP facility need to be provided on the drawings. This includes the proposed diversion and conveyance structures from the point where the east tributary crosses Clay East Road to Clay Creek.
- drawings that include all proposed vegetative areas and soil amendment specifications with regard to excessive drainage, low pH, and high salinity characteristics of the site soil types.
- a description of the dewatering protocol to be used in the event of groundwater contact during excavation activities.

- a description of stormwater inlet protection to be implemented during construction.
 - a set of erosion control drawings and narrative, designed and sealed by a professional engineer/erosion control specialist.
 - a drawing and plan that will ensure that the CPP be built above the 100-year flood elevation.
2. To conserve freshwater, the applicant will use a ZLD system on both Phase 1 and 2 of the CPP, and will propose an alternative that additionally conserves or avoids the use of freshwater for the Phase 2 portion of the CPP.
 3. The applicant has stated that the 15,000 AFY currently allocated for the Rancho Seco Power Plant site (reservoir and Power Plant) will not increase due to the addition of the CPP project. Some reductions in current water use at the Rancho Seco Power Plant site will off-set the needs of the CPP resulting in no net increase in water use due to the CPP.

CONCLUSIONS AND RECOMMENDATIONS

Staff commends SMUD for proposing to use a Zero Liquid Discharge system for the CPP. ZLD avoids a wastewater discharge to surface water and results in significant water savings over the original CPP proposal.

The applicant has stated they will propose an alternative that additionally conserves or avoids the use of freshwater for the Phase 2 portion of the CPP. The applicant has not submitted a proposal identifying their intentions at this writing. However, staff expects the applicant to submit a proposal soon and it will be analyzed in the FSA.

No significant impacts are expected regarding erosion or sedimentation provided the Conditions of Certification are required and implemented.

SMUD must provide a flood encroachment analysis, a flood analysis that includes the switchyard, and maps/drawings that clearly depict the designs of proposed conveyance features so that staff can complete the CPP project Final Staff Assessment.

CONDITIONS OF CERTIFICATION

SOIL&WATER 1: Prior to site mobilization, the project owner shall obtain a National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharge associated with CPP construction activities. The project owner will develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire project. This plan will include a Stormwater Management plan consistent with the Sacramento County's Drainage Design Standards.

Verification: No later than 60 days prior to site mobilization for any project element, the project owner shall submit a copy of the NPDES permit for stormwater discharge to the Compliance Project Manager (CPM). The project owner will submit a SWPPP to the CPM for review and approval. The SWPPP will include copies of any other permits for the CPP that specify requirements for the protection of stormwater or water quality. Approval of the plan by the CPM must be received prior to site mobilization.

SOIL&WATER 2: Prior to the start of site mobilization for any project element, the project owner shall obtain CPM approval of a site specific Erosion Control and Revegetation Plan that addresses all project elements.

Verification: No later than 60 days prior to the start of site mobilization for any project element, the Erosion Control and Revegetation Plan shall be submitted to the CPM. The plan can be included in the SWPPP. The plan shall comply with Sacramento County requirements. The plan must be approved by the CPM prior to site mobilization for any project element.

SOIL&WATER 3: The project owner shall obtain and comply with all requirements of the NPDES general permit for stormwater discharge associated with industrial activities of the CPP. The project owner will develop and implement a Storm Water Pollution Prevention Plan for the operation of the power plant. The project owner must obtain approval of the General Industrial Activities SWPPP from the CPM prior to commercial operation of the CPP.

Verification: No later than 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a copy of the SWPPP prepared under requirements of the General Industrial Activity Storm Water Permit. The operational SWPPP shall be approved by the CPM prior to the start of commercial operation.

SOIL&WATER 4: Prior to site mobilization for any project element, the project owner shall submit copies, as appropriate, of CDFG's Streambed Alteration Agreement, and CWA Section 401, 402, and 404 permits. The project owner will comply with all requirements in those permits.

Verification: No later than 30 days prior to site mobilization for any project element, copies of the final Streambed Alteration Agreement, and CWA 401, 402, and 404 permits shall be submitted to the CPM.

SOIL&WATER 5: The project owner shall build the CPP above the 100-year flood elevation.

Verification: No later than sixty days prior to site mobilization for any project element the project owner shall submit to the CPM a flood avoidance plan for the CPP site. This plan must clearly show that the site will be above the 100-year flood

plain. This plan must be approved by the CPM prior to the initiation of site mobilization activities.

SOIL & WATER 6: The project owner will use a ZLD system on Phase 1 of the CPP. The 15,000 AFY currently allocated for the Rancho Seco Power Plant site (reservoir and Power Plant) will not increase due to the addition of the CPP project. Some reductions in current water use at the Rancho Seco Power Plant site will offset the needs of the CPP resulting in no net increase in FSC freshwater use due to the CPP.

Verification: No later than 90 days following each full year of operation, the project owner will submit a report quantifying the amount of water used at the Rancho Seco Power Plant (RSP) site from all sources. Especially the amount of FSC water used for the RSP and CPP. This report shall also discuss the amount of ZLD salt cake materials disposed and where disposed. This report will be submitted to the CPM annually.

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WORKER SAFETY AND FIRE PROTECTION

Alvin J. Greenberg, Ph.D. and Rick Tyler

INTRODUCTION

Worker safety and fire protection is enforced by laws, ordinances, regulations, and standards (LORS), and implemented at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment, or procedural controls.

The purpose of this Staff Assessment is to assess the worker safety and fire protection measures proposed by the Cosumnes Power Plant (CPP) project and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970. This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, § 651 (29 U.S.C. §§ 651 through 678). Implementing regulations are codified at Title 29 of the Code of Federal Regulations, under General Industry Standards §§ 1910.1 - 1910.1500 and clearly define the procedures for conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under this OSH Act represent a compilation of materials from existing federal standards and national consensus standards. These include standards from the voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA) which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health Act is to “assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources,” (29 USC § 651). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of Labor established the

Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the OSH Act.

Applicable Federal requirements include:

- 29 U.S. Code § 651 et seq. (Occupational Safety and Health Act of 1970);
- 29 CFR §1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations);
- 29 CFR §1952.170 – 1952.175 (Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 – 1910.1500).

STATE

California passed the Occupational Safety and Health Act of 1973 ("Cal/OSHA") as published in the California Labor Code § 6300. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with §337-560 and continuing with §1514 through 8568. The California Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)) and thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements published at 29 CFR §1910.1 - 1910.1500. The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

The State of California Department of Industrial Relations is charged with responsibility for administering the Cal/OSHA plan. The Department of Industrial Relations is further split into six divisions to oversee, among other activities: industrial accidents, occupational safety and health, labor standards enforcement, statistics and research, and the State Compensation Insurance Fund (workers compensation).

Employers are responsible for informing their employees about workplace hazards, potential exposure, and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981 (8 CCR § 5194). This regulation was promulgated in response to California's Hazardous Substances Information and Training Act of 1980. It was later revised to mirror the Federal Hazard Communication Standard (29 CFR §1910.1200) which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDSs) to workers. MSDSs provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, 8 CCR §3203 requires that employers establish and maintain a written Injury and Illness Prevent Program to identify workplace hazards and communicate them to its employees through a formal employee-training program.

Applicable State requirements include:

- 8 CCR §330, et seq. Cal/OSHA regulations;
- 24 CCR § 3, et seq. - incorporates the current addition of the Uniform Building Code;
- Health and Safety Code § 25500, et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code § 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

LOCAL

The California Building Standards Code published at Title 24 of the California Code of Regulations § 3 et seq. is comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building & safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Part 9 of Title 24 pertaining to the California Fire Code.

Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United States' premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition. The Herald Fire Department is the administering agency for the 1998 Uniform Fire Code (Hendrickson 2002).

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9);
- California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.).
- Uniform Fire Code, 1998

SETTING

The proposed project is located in southern Sacramento County, about 25 miles southeast of Sacramento, about 0.5 miles south of the former Rancho Seco nuclear power plant.

The CPP project involves construction and operation of a natural gas fired combined cycle facility with ancillary facilities including pipelines.

Fire support services to the site would be under the jurisdiction of the Herald Fire District. The closest fire station is located at 11620 Clay Station Road in Herald, which is approximately two miles away (Hendrickson 2002). The response time to the project site is estimated to be less than 10 minutes (Hendrickson 2002). Backup fire suppression support would be provided by the station located at 12746 Ivie Road, in Herald, with a response time of about 15 minutes.

The County of Sacramento Hazardous Materials Team station 7 is assigned as the off-site hazardous materials first responder for the CPP. Station 7 is located north of Elk Grove, and their response time is estimated to be 30 minutes (Rothchild 2002).

IMPACTS

WORKER SAFETY

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the Cosumnes Power Plant project to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers would be adequately protected from health and safety hazards.

FIRE HAZARDS

During construction and operation of the proposed Cosumnes Power Plant project there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS would be adequate to assure protection from all fire hazards. The Herald Fire District has stated that it is adequately equipped and staffed to respond to an on-site fire within 10 minutes or less (Hendrickson 2002), and the Sacramento County Environmental Management Department (SCEMD) stated that they are prepared to deal with any hazardous materials spill (Rothchild 2002).

APPLICANT'S PROPOSED MITIGATION

WORKER SAFETY

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The Cosumnes Power Plant project encompasses construction and operation of a natural gas fired facility with ancillary facilities such as transmission lines and pipelines. Workers would be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published at 8 CCR § 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phases of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509);
- Construction Fire Protection and Prevention Plan (8 CCR § 1920); and
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) would include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Confined Space Entry Program;

- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of the Cosumnes Power Plant project, detailed programs and plans would be provided pursuant to the condition of certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Upon completion of construction and prior to operations at the Cosumnes Power Plant project, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Emergency Action Plan (8 CCR § 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) would be applicable to the project. Written safety programs, which the applicant would develop, for the Cosumnes Power Plant project would ensure compliance with the above-mentioned requirements.

The AFC includes an adequate outline of the Emergency Action Plan (SMUD 2001a, pages 8.7-12 and 8.7-16). Prior to operation of the Cosumnes Power Plant project, all detailed programs and plans would be provided pursuant to condition of certification **WORKER SAFETY-2**.

Safety and Health Program Elements

The Applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program (SMUD 2001a, Section 8.7.4.3). The measures in these plans are derived from applicable sections of state and federal law. The major items required in both construction and operation Safety and Health programs are as follows:

Injury and Illness Prevention Program (IIPP)

The applicant would submit an expanded Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to construction and operation of the project.

The IIPP would include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Methods of documenting inspections and training and for maintaining records; and
- A training program for introducing the program; for new, transferred, or promoted employees; for new processes and equipment; for supervisors; for contractors.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (SMUD 2001a, pages 8.7-12 and 8.7-16).

The outline lists the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities during Emergencies;
- Specific Response Procedures;
- Evacuation Plan;
- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;
- Accident Reporting and Investigation;
- Lockout/Tagout;
- Hazard Communication;
- Spill Containment and Reporting;
- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;

- Sanitation; and
- Work Site Inspections.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC describes a proposed fire prevention plan which is acceptable to staff (SMUD 2001a, pages 8.7-11 and 8.7-15). The plan would include the following topics:

- Responsibilities;
- Procedures for fire control;
- Fixed and Portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

Staff proposes that the Applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the Herald Fire District for review and approval to satisfy proposed conditions of certification

WORKER SAFETY-1 and -2.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR § 3380-3400). The CPP project's operational environment would require a PPE program.

Information provided in the AFC indicates that all employees required to use PPE would be checked for proper fit and to see if they are medically capable of wearing the equipment. All safety equipment would meet NIOSH or ANSI standards and would carry markings, numbers, or certificates of approval. Respirators would meet NIOSH and California Department of Health and Human Services Standards. Each employee would be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When the protective clothing and equipment are to be used;
- Benefits and limitations; and
- When and how the protective clothing and equipment are to be replaced.

A PPE program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program.

Operations and Maintenance Written Safety Program

In addition to the specific plans listed above, there are additional LORS applicable to the project, which are called "safe work practices". Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

FIRE PROTECTION

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (SMUD 2001a, Sections 8.7.4.5 and 8.8.3.6.2) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. The project would rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be required by the Herald Fire District.

During construction an interim fire protection system would be in place. The permanent facility fire protection system would be placed in service as early as possible during the construction phase.

The information in the AFC indicates that the project intends to meet the minimum fire protection and suppression requirements. Staff agrees that the project would indeed meet all requirements. Elements include both fixed and portable fire extinguishing systems. The Rancho Seco Reservoir would supply firewater for the project site, via connection to an existing 48" water pipe. Backup water would be provided by on-site firewater storage supply consisting of a minimum of 180,000-gallons in raw water storage tanks. The firewater pumping system consists of two fire pumps driven by electric motors. This system would provide more than an adequate quantity of fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems.

Fire hydrants and fixed suppression systems would be supplied from the underground firewater loop piping system (SMUD 2001a, Section 2.2.12).

This fire water supply and an on-site electric fire-water pumping system would provide more than an adequate quantity of fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The motor driven fire pump would be capable of supplying maximum water demand for any automatic sprinkler system plus water for fire hydrants and hose stations.

An FM 200 fire protection system would be provided for the combustion turbine generator (CTG) and accessory equipment (SMUD 2001a, Section 2.2.12). FM 200 is a non-halon chemical fire retardant approved by the U.S. EPA for use in occupied structures.

Fire hydrants and hose stations would supplement the plant fire protection system using water from the plant underground firewater system. Fire hydrants with hose houses would be placed in accordance with NFPA 10 and local fire codes.

The applicant would be required to provide the final Fire Protection and Prevention Program to staff and to the Herald Fire District, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. A facility closure plan would be developed prior to closure to incorporate these requirements.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of the Cosumnes Power Plant project, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the Herald Fire District and found that cumulative impacts were insignificant. There are few industrial facilities in this agricultural area, Fire Chief Glen Hendrickson confirmed that the Herald Fire Department is adequately staffed and equipped to control whatever fire would occur at an industrial facility of this type, and the department's response time would be adequate (Hendrickson 2002). Staff also finds that the fire-fighting response time is no greater than for other California rural power plants previously certified by the Energy Commission.

CONCLUSION AND RECOMMENDATIONS

If the applicant provides a Project Construction Safety and Health Program and a Project Operations Safety and Health Program as required by conditions of certification **WORKER SAFETY-1** and **2**, staff believes that the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. The Safety and Health Programs apply to all project-related construction and

operations, including the new gas pipeline and compressor stations. Staff also concludes that the proposed project, including the new natural gas line and compressor stations, would not have significant impacts on local fire protection services. The proposed facility is located south of the former Rancho Seco nuclear plant site and is currently served by the local fire department. The fire risks of the existing facility are similar to those of the decommissioned Rancho Seco Power Plant and thus pose no new or added demands on local fire protection services.

If the Energy Commission certifies the project, staff recommends that the Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Safety Program;
- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the Herald Fire District for review and comment prior to submittal to the CPM.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a letter from the Herald Fire District stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;

- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted to the Herald Fire District for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety & Health Program.

REFERENCES

1998 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

Adams, Forrest. Battalion City of Sacramento, Hazardous Materials Administration. Personal communications April 30, 2002.

Hendrickson, Glen. Fire Chief, Herald Fire Department. Personal communications, April 30 and July 29, 2002.

Rothchild, Elise. Supervising Hazardous Materials Specialist, Sacramento County Environmental Management Department, Hazardous Materials Division. Personal communications April 30, 2002.

SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Shahab Khoshmashrab, Al McCuen, and Steve Baker

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical, and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the intent of the engineering LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the Energy Commission to “prepare a written decisionwhich includes...(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities...with public safety standards...and with other relevant local, regional, state, and federal standards, ordinances, or laws...” (Pub. Resources Code, §25523).

SUBJECTS DISCUSSED

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant’s proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

SETTING

SMUD proposes to construct and operate a nominally rated 1,000 megawatt, combined cycle power plant known as the Cosumnes Power Plant (CPP). The project would be located 25 miles southeast of the city of Sacramento. The site would occupy approximately 30 fenced acres located at the south side of Rancho Seco Nuclear Plant and would lie in seismic zone 3. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices 10A through 10G (SMUD 2001a).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (SMUD 2001a, Appendices 10A through 10G). Some of these LORS include; California Building Code (CBC), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM) and American Welding Society (AWS).

ANALYSIS

The basis of this analysis is the applicant's proposed analysis and construction methods and list of engineering LORS and design criteria set forth in the AFC.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as a natural gas pipeline and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendices 10A through 10G for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical, and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and

that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 1998 edition of the California Building Code (CBC) and other applicable codes and standards in effect at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (SMUD 2001a, § 2.4.5) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees, as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in-lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite SMUD, a municipal utility, to act as CBO for the project. Energy Commission staff will complete a Memorandum of Understanding (MOU) with SMUD that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical, and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe, and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of the following items:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans, and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

On May 28, 2002, staff received a phone call from Barbara Dieter, a resident who lives west of the proposed Winters natural gas compressor station. The existing PG&E's natural gas pipeline passes through her property. She wanted to know if it would be safe to compress the gas in the existing pipeline to the pressure that SMUD is proposing. She asked if the existing pipeline is strong enough to handle the additional pressure and if it were sized to handle the pressure that SMUD is now proposing to place in the pipeline.

PG&E's guaranteed pressure to SMUD at the Winters inter-tie station is 600 pounds per square inch gauge (psig). Currently, the delivered pressure is higher than 600 psig; it is 722 psig or greater. In 1996, SMUD installed the existing piping at the Winters inter-tie station, a Class 2 location (as designated by Federal Department of Transportation (CFR 49 § 192.5)). Piping in Class 2 locations has a maximum allowable operating pressure (MAOP) of 787 psig. However, SMUD operates the piping at the Winters inter-tie station as a Class 3 location (which has a MAOP of 722 psig). Therefore the natural gas pressure in the existing line currently does not exceed 722 psig. Natural gas leaving SMUD's Winters inter-tie must be at 722 psig to provide adequate pressure to fuel the existing Carson Ice-Gen cogeneration facility in Elk Grove and to fuel SMUD's proposed Phase 2 of the CPP project. Over time, as there are additional inter-ties/users along PG&E's 400/401 line, pressure available at the existing Winters inter-tie could drop to the PG&E guaranteed 600 psig. SMUD proposes to install a natural gas compressor station adjacent to the Winters inter-tie so that in the event the gas pressure drops below 722 psig, the pressure would be boosted to 722 psig, which would not exceed the 787 psig MAOP (SMUD 2002z, page 10 and CEC 2002q).

Staff has evaluated SMUD's response and agrees that since the Winters compressor station would only boost the pipeline pressure to within the current MAOP, staff does not believe the continued operation of the existing pipeline at the higher pressure stated above would create the potential to endanger public safety.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.

3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking, and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

RECOMMENDATIONS

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 1998 CBC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking, and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 1998 California Building Code (CBC) and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.)

In the event that the initial engineering designs are submitted to the CBO when a successor to the 1998 CBC is in effect, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern. All transmission facilities (lines, switchyards, switching stations, and substations) Conditions of Certification are addressed in the **Transmission System Engineering** section of this document.

Verification: Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy].

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List, and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 1** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Facility Design Table 1: Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	4
Combustion Turbine Generator Foundation and Connections	4
Steam Turbine (ST) Foundation and Connections	2
Steam Turbine Generator Foundation and Connections	2
Heat Recovery Steam Generator (HRSG) Structure, Foundation and Connections	4
HRSG Stack Foundation and Connections	4
CT Main Transformer Foundation and Connections	4
ST Main Transformer Foundation and Connections	2
CT Air Inlet Filter Foundation and Connections	4
CEMS Enclosure Structure, Foundation and Connections	4
Blowdown Tank Foundation and Connections	4
HRSG Boiler Feed-water Pump Foundation and Connections	4
Ammonia Injection Skid Foundation and Connections	4
Circulating Water Pumps Foundation and Connections	2
Cooling Tower Structure, Foundation and Connections	2
Raw Water Storage Tank and Pumps (Includes Fire-water) Foundations and Connections	2
Demineralized Water Storage Tank and Pumps Foundation and Connections	2
Demineralized Water Treatment Building Structure, Foundation and Connections	1
Ammonia Storage Tank Foundation and Connections	1
Accessory Module (Lube Oil, Hydraulics and Liquid Fuel) Foundations and Connections	4
STG Lube Oil Module Foundation and Connections	2
Electrical Control Panel Foundation and Connections	4
Isolation and Excitation Transformer Foundation and Connections	4
Electrical Building Structure, Foundation and Connections	2
Water Wash Skid Foundation and Connections	4
Air Process Skid Foundation and Connections	4
Oil/Water Separator Skid Foundation and Connections	1
Control Room Structure, Foundation and Connections	1
Maintenance Building and Warehouse Structure, Foundation and Connections	1
Administration Building Structure, Foundation and Connections	1
Cooling Tower Chemical Feed System Foundation and Connections	1
Switchyard Building Structure, Foundation and Connections	1
Auxiliary Transformer Foundation and Connections	4
Fire Protection Skid Foundation and Connections	4

Equipment/System	Quantity (Plant)
Generator Auxiliary and Static Starter Foundation and Connections	4
Acid and Caustic Tank Foundation and Connections	1
Neutralization Tank Foundation and Connections	1
Gas Metering Station Structure, Foundation and Connections	1
HRSG Chemical Feed System Foundation and Connections	4
Raw Water Treatment Building Structure, Foundation and Connections	1
Waste Water Sump Structure and Foundation	1
Water Treatment Building Structure, Foundation and Connections	1
Reserve Auxiliary Transformer	1
Fire Water Pump Foundation and Connections	1
Switchyard Room Structure, Foundation and Connections	2
Battery Room Structure, Foundation and Connections	2
DCS Room Structure, Foundation and Connections	2
Steam/Water Sample Lab Structure, Foundation and Connections	2
Gas Compressor Building Structure, Foundation and Connections	1
Gas Compressor Recycle Cooler Foundation and Connections	1
Waste Water Clarifier System Foundation and Connections	1
Condensate Pumps Foundation and Connections	3
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Substation/Switchyard, Buses and Towers	2 Lots
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan check, and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 1998 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer, or civil engineer as a resident engineer (RE) to be in general responsible charge of the project (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities).

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part. All transmission facilities (lines, switchyards, switching stations, and substations) Conditions of Certification are addressed in the **Transmission System Engineering** section of this document.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other

delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: D) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731, and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations, and substations) Conditions of Certification are addressed in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project [1998 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A: The civil engineer shall:

1. Design, or be responsible for design, stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and
2. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B: The soils engineer, the geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; and Section 3309.6, Engineering Geology Report;
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33; Section 3317, Grading Inspections; (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both);
3. Recommend field changes to the civil engineer and RE;
4. Review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement, or collapse when saturated under load; and
5. Prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18 section 1804, Foundation Investigations.

The engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [1998 CBC, section 104.2.4, Stop orders].

C: The engineering geologist shall:

1. Review all the engineering geology reports and prepare final soils grading report.

D: The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications, and calculations.

E: The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F: The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer, and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 1998 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work

(requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations, and substations) Conditions of Certification are addressed in the **Transmission System Engineering** section of this document.

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [1998 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks, and pressure vessels).

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of

Noncompliance]. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings [1998 CBC, Section 108, Inspections]. The project owner shall retain one set of approved engineering plans, specifications, and calculations at the project site or at another accessible location during the operating life of the project [1998 CBC, Section 106.4.2, Retention of Plans].

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications, and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils report as required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; and Section 3309.6, Engineering Geology Report].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly

Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [1998 CBC, Section 104.2.4, Stop orders].

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 1998 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO and the CPM [1998 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR) and the proposed corrective action. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage facilities, the project owner shall obtain the CBO's approval of the final "as-graded" grading plans and final "as-built" plans for the erosion and sedimentation control facilities [1998 CBC, Section 109, Certificate of Occupancy].

Verification: Within 30 days of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO the

responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes. The project owner shall submit a copy of this report to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Facility Design Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications [1998 CBC, Section 108.4, Approval Required];
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures at least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [1998 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents]; and
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer [1998 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2** above, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications, and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the non-conforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports, including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description, or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies to the CBO, with a copy of the transmittal letter to the CPM [1998 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 1998 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with the requirements of this Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations for each plant major piping and plumbing system listed in **Facility Design Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [1998 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 1998 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the

CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations, and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific County (local) code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [1998 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 1**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [1998 CBC, Section 108.3, Inspection Requests].

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate

section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications, and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings, and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications, and calculations conform with the applicable LORS [1998 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not

related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations [CBC 1998, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [1998 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations, and substations) Conditions of Certification are addressed in the **Transmission System Engineering** section of this document.

- A. Final plant design plans to include:
 - 1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
 - 2. system grounding drawings.
- B. Final plant calculations to establish:
 - 1. short-circuit ratings of plant equipment;
 - 2. ampacity of feeder cables;
 - 3. voltage drop in feeder cables;
 - 4. system grounding requirements;
 - 5. coordination study calculations for fuses, circuit breakers, and protective relay settings for the 13.8 kV, 4.16 kV, and 480 V systems;
 - 6. system grounding requirements; and
 - 7. lighting energy calculations.
- C. The following activities shall be reported to the CPM in the Monthly Compliance Report:
 - 1. Receipt or delay of major electrical equipment;
 - 2. Testing or energization of major electrical equipment; and
 - 3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

CEC (California Energy Commission) 2002q. Report of conversation between Kristy Chew, CEC, and Kevin Hudson and Joseph Pennington, SMUD, regarding Winters compressor station. July 11, 2002. Docket date July __, 2002.

SMUD 2001 a. Application for Certification for Cosumnes Power Plant Project Volume 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001.

SMUD (Sacramento Municipal Utility District) 2002z. Data Response, Set 3D – Responses to Data Requests 188, 191, 201, 202, 204, 206, 207, 229, and 235. June 7, 2002. Docket date June 7, 2002.

GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Janine W. Band, Ph.D., R.G.

INTRODUCTION

In this section, staff discusses the setting of the Sacramento Municipal Utility District's (SMUD) Cosumnes Power Plant (CPP) project and its potential impacts regarding geological hazards and geological (including mineral) and paleontological resources. The purpose of this analysis is to verify that the applicable laws, ordinances, regulations, and standards (LORS) have been identified and that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety. Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during project construction, operation, and closure. The section concludes with staff's proposed monitoring and mitigation measures with respect to geological hazards and geological and paleontological resources, with the inclusion of Conditions of Certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS are listed in the Application for Certification (AFC), in Sections 8.15.2 (Geological Hazards), 8.16.2 (Paleontology), (SMUD 2001a, §8.15.2 and 8.16.2). A brief description of the LORS for geological hazards and mineralogical and paleontological resources follows.

FEDERAL

There are no federal LORS for geological hazards and resources, or grading and erosion control for the proposed project. The Federal Antiquities Act of 1906 (16 United States Code Section 431 *et seq.*), in part, protects paleontologic resources from vandalism and unauthorized collection on federal land. The National Environmental Policy Act of 1969 (United States Code, section 432 *et seq.*; 40 Code of Federal Regulations, section 1502.25), as amended, requires analysis of potential environmental impacts to important historic, cultural, and natural aspects of our national heritage.

STATE AND LOCAL

The California Building Code (CBC) 1998 edition is based upon the Uniform Building Code (UBC), 1997 edition, which was published by the International Conference of Building Officials. The CBC is a series of standards that are used for investigation, design (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33). The CBC supplements the UBC's grading and construction ordinances and regulations.

The California Environmental Quality Act (CEQA) Guidelines (Cal. Code Regs., title 14, Appendix G), provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Section (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geological hazards.
- Section (X) (a) and (b) pose questions about the project's effect on mineral resources.
- Section 15064.5 (a)(3)(D) indicates "generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history."

Further guidelines for the assessment and mitigation of paleontological resources are provided in the *Standard Procedures, Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources* (SVP, 1995). They were adopted in October 1994 by a national organization of vertebrate paleontologists (the Society of Vertebrate Paleontologists).

SETTING

The CPP is a proposed 1,000-megawatt combined-cycle generation, combustion turbine facility to be located about ½-mile south of the closed Rancho Seco Nuclear Plant. The project modifications to the existing facilities include (SMUD 2001a, §1.1):

- The construction of four combustion turbine generators and the related equipment.
- A new 1.5-acre detention pond to hold 100,000 cubic feet of water before release to Clay Creek.
- An on-site package treatment plant for treating process and cooling water.
- A septic and leachfield system for sanitary waste.
- 0.4 miles of 230-kV transmission line between the CPP switchyard and the Rancho Seco Nuclear Plant switchyard.
- 0.4-mile water supply line from the Rancho Seco Nuclear Plant to the CPP.
- A 26-mile extension of a SMUD-owned natural gas supply line from the Carson Ice-Generation Facility to the CPP.
- Two natural gas compressor stations.

The CPP facility is located along the eastern margin of the Central Valley, at an average elevation of 150 feet. The site is well above the floodplain of the major rivers. The site is underlain by consolidated silt, sand, and gravel of the Laguna Formation alluvial deposits, and is blanketed by arkosic, gravelly alluvium of the Modesto-Riverbank Formation that occupies the broad, shallow valley of Clay Creek (Wagner, et al., 1981). Clay Creek is an ephemeral stream that crosses the northeastern corner of the CPP

site. The channel has been modified where the access road to the Rancho Seco Nuclear Plant crosses it.

An earthen dam reservoir, built for storage of emergency cooling water for the Rancho Seco Nuclear Plant is located approximately one mile upstream from the proposed site on Clay Creek.

IMPACTS

There are two types of impacts considered in this section. The first is geologic hazards that could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second is impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

STAFF'S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

There are no federal LORS with respect to geologic hazards and geologic and mineralogic resources; however, the CBC provides geotechnical and geological investigation and design guidelines which engineers must adhere to when designing a proposed facility. As a result, assessing geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic, and mineral resource maps for the surrounding area are reviewed, in addition to any site-specific information provided by SMUD, to determine if geologic and mineralogic resources are present in the area. If present, operating procedures of the proposed facility, in particular ground water extraction and mass grading operations, are reviewed to determine if such operations could adversely impact such resources.

Based on CEQA Guidelines, staff reviews existing paleontologic information for the surrounding area, as well as any site-specific information provided by SMUD, in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If any resources are present or likely to exist, staff recommends adoption of Conditions of Certification, which outline procedures required during construction to mitigate impacts to potential resources.

GEOLOGICAL HAZARDS

Faulting and Seismicity

Energy Commission staff reviewed the following publications of the California Division of Mines and Geology (CDMG): *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (CDMG, 1994); *Geologic Map of California – Sacramento Sheet* (Wagner et al., 1981); *Probabilistic Seismic Hazard Map*

for California, (CDMG, 1996); and *Seismic Shaking Hazard Maps of California, Map Sheet 48* (CDMG, 1999a). No active or potentially active faults are known to cross the power plant footprint or the associated linears. The project is located within Seismic Zone 3 as delineated on Figure 16-2 of the 1998 edition of the CBC. The closest known faults are those of the Foothills Fault System, located between 11 and 15 miles east and north of the project site. Together, the various faults of the Foothills system are 174 miles long, trending north to northwest. They separate several bedrock groups in the eastern Sierra with nearly vertical faults. In the vicinity of the CPP site, the faults are considered to be inactive, though 40 miles north, in Auburn, more recent fault activity (described as possibly Holocene) has been noted, (Mualchin, 1996).

The nearest known active faults are those associated with the San Andreas Fault system: the Greenville (53 miles west), Concord (58 miles west), Calaveras (65 miles west), Hayward (71 miles west), and the San Andreas proper (90 miles west). These are all active, nearly vertical strike-slip faults associated with a plate boundary of the Pacific and North American Plates. Blind thrust faults along the Coast Range-Central Valley margin lie 44 to 62 miles west and southwest of the site. The thrust faults are poorly characterized, but in places have been described as west-dipping faults that allow displacement of western rocks toward the east. The primary surface expressions of these faults are anticlinal folds lying east of the front range of the Coast Ranges.

On January 23, 2002 Energy Commission staff visited the project location and did not observe any evidence of surface faulting. Previous investigations at the site (performed near the Rancho Seco Nuclear Plant) found no faults crossing the CPP site (EGC, 1993). The potential of surface rupture on a fault at the power plant footprint is considered to be very low, since no active faults are known to have ruptured the ground surface of the project site, no geomorphic evidence of ancient faults is recognized, and no microseismicity is known at the site (CDMG references listed above). No identified faults are mapped along the water, gas or transmission lines, thus, risk of fault rupture along these linears is also low.

SMUD refers to the CDMG report of Mualchin (1996) to characterize likely ground-shaking due to an earthquake. Mualchin estimates a magnitude 6.5 earthquake along the Foothills fault system would cause peak ground acceleration of up to 0.2 to 0.3g (gravity) near the site. These values are higher than those shown on the CDMG *Map Sheet 48* (CDMG, 1999a), which predicts a peak ground acceleration with a 10 percent chance of exceedance in 50 years of between 0.10 and 0.20g for the project area.

The seismic design criteria specified in the AFC simply identify the UBC sections that would be used when designing buildings and structures (UBC Section 10B3.6.1), (SMUD, 2001a, §8.15.2 and 8.16.2). Design and construction of the project to conform to the California Building Code (1998) requirements outlined in **Conditions of Certification GEN-1, GEN-5, and CIVIL-1** would reduce the impact of strong seismic ground shaking to less than significant.

Rancho Seco Reservoir is a small reservoir located approximately two miles upstream of the CPP site, on Clay Creek. The reservoir has a maximum capacity of 2,850 acre-feet. The maximum dam height is approximately 60 feet, total length is 1,800 feet, and

crest width is 28 feet. The side slopes were constructed at a 4:1 slope. The reservoir was designed to supply cooling water and fire-flow water to the Rancho Seco Nuclear Plant in the event of an emergency such as a loss-of-coolant accident, fire, or other emergency, including one resulting from a seismic event. The reservoir and dam were analyzed prior to its construction and approved by the NRC for the intended purposes (SMUD 2002a, Data Response 54). The dam is under the jurisdiction of the State of California, Division of Dam Safety, and as such, is designed and constructed to standards established by the State of California, which include consideration for earthquake and extreme flood.

SMUD indicates the effects on the CPP from a dam failure or other sudden release of water have been investigated. An instantaneous break 50 feet wide and the full height of the dam occurring simultaneously with the peak flow from a design storm would not flood the CPP site. The resulting flow would have a water surface more than 10 feet below any of the safety features. The minimum elevation of the Rancho Seco Nuclear Plant industrial area is 147.5 feet above mean sea level, which is the same as the minimum elevation planned for the CPP as shown in AFC Figure 8.14-4.

Staff consulted with the Department of Water Resources' Department of Dam Safety (DSOD) Engineer for Area 5 of the Central Region on the Rancho Seco Reservoir Dam. The most recent dam inspection report (dated 1/12/02) indicates "the dam, reservoir, and the appurtenances are judged satisfactory for continued use." A complete dam appraisal was performed in 1986; no safety issues were identified at that time. The dam was built to code in 1972 and has been under DSOD jurisdiction since. Based on this information, and the fact that the design peak ground accelerations at this site are relatively low (0.2 g to 0.3 g), staff concludes the dam is unlikely to fail during the design earthquake, and the CPP site is at low risk.

Liquefaction, Subsidence, and Expansive Soils

Liquefaction is a condition in which a cohesionless soil loses its shear strength due to a sudden increase in pore water pressure. The soils most prone to liquefaction during earthquakes are fine-grained, poorly graded, saturated sands and silts. CDMG (1997) states that if depth to groundwater is greater than 50 feet, and groundwater is not expected to become shallower, then the soils generally do not constitute a liquefaction hazard that would require mitigation.

The subsurface investigations of the geotechnical report included in Appendix 8.15A of the AFC were not performed at the CPP site, but 0.6 miles to the north (EGC, 1993). The subsurface conditions at the CPP site are likely to be different and, prior to construction; a new geotechnical and soils investigation should be performed at the CPP site per the Conditions of Certification **GEN-1** and **CIVIL-1**.

The previous investigation (0.6 miles north of the CPP site), found the groundwater to be about 150 feet below the surface. Also, most of the boreholes drilled to as much as 75 feet were dry when drilled in the Spring of 1993 (when ground water would be expected to be rather high). This indicates the soils and sediments occurring in the vicinity of the CPP site are generally well drained, with groundwater levels significantly

deeper than 50 feet – the threshold depth of liquefaction in unconsolidated materials. Therefore, staff's assessment is that the potential for liquefaction is low.

The potential impact of subsidence was not considered in the geotechnical report of 1993, though the likelihood of subsidence at the CPP site is probably very low due to the nature of the soils and unconsolidated sediments. Subsidence is the process of the loss of soil and alluvium volume upon the application or removal of water. Subsidence can occur where the water table is lowered through overly aggressive groundwater pumping, usually associated with agricultural wells. No large-scale agricultural pumps are active in the vicinity of the CPP site (DWR website, 2002). Also, the soils and sediment at the site are dense and relatively dry (ECG, 1993) so that the potential for subsidence is considered to be low. The potential for damage to the project linears from local subsidence is unknown and should be addressed in the geotechnical report as required in **Conditions of Certification GEN-1 and CIVIL-1**.

Soils that contain a high percentage of expansive clay minerals are prone to expansion if subjected to an increase in water content. Expansive soils are usually measured with an index test such as the expansive index potential. In order for a soil to be a candidate for testing, the soil must have a high clay content and the clay must have a high shrink-swell potential and a high plasticity index. Based on descriptions of two borings (ECG, 1993), sands, silts, and clays, with minor amounts of gravel are present to depths of 75 feet below the ground surface. Clay expansivity was not measured or discussed in the ECG report. Further investigation of the location, depth and thickness of expansive soils at the CPP site should be considered before final design. Consequently, the potential for damage to the project facilities from expansive soils is incompletely characterized at this time, especially for the linears. If and when expansive soils are encountered in geotechnical investigations for the linears, the project would be subject to measures noted in **Condition of Certification GEN-1**.

Tsunami, Seiche

Earthquakes or undersea landslides can trigger seismic waves, or tsunamis that can affect coastal areas. The site is not in an area that is subject to tsunamis. Earthquakes are also known to cause seiches, oscillating waves in a lake or bay that can cause damage to nearby low-lying development. The small reservoir upstream from the CPP site is not likely to produce seiche waves due to the small size and to the distance from major seismic sources.

Slope Failures

The potential for slope failures at the power plant site is considered to be low. The project is located on well-drained alluvium that has a slope of between 1 and 2 percent, and there are no significant slopes adjacent to the site. The southern tributary to the Clay Creek channel would be relocated several tens of feet to the north, allowing the site to be built up at the northern edge. If not well-engineered, this fill may have some potential to slump or settle. Close adherence to the soils engineering portions of **Condition of Certification GEN-1** would ensure that the engineered fill and banks would perform properly. The banks of Clay Creek and its tributaries are not likely to be potential locations of failure, as they also have very low slopes.

GEOLOGICAL, MINERALOGICAL, AND PALEONTOLOGICAL RESOURCES

The only potential geological and mineral resources on the site are placer gold, a potential aggregate source, and natural gas from the subsurface. Dredge tailings east of the CPP site indicate that Clay Creek has been explored for placer gold; the works have since been abandoned. The mineral resources map of Sacramento County (CDMG, 1999) showed the CPP site zoned as MRZ-3, indicating the area is known to have aggregate resources but the significance of the resources has not been determined. Most aggregate quarry operations are placed near urban areas. As the CPP site is located much farther away from the urban corridor than many other identified resource areas, the potential for a loss of resources is low.

Natural gas is produced in the central and western parts of the Central Valley. Deposits from which gas is produced are not present under the proposed CPP site. No other significant mineralogical resources are known to exist in the project area.

SMUD (2001a, Section 8.16.3) presented a thorough review of the geological units and the potential paleontological resources that underlie the proposed CPP site. The paleontological assessment included both an archival record search from the University of California, Berkeley, Museum of Paleontology and field surveys of the project site by qualified paleontologists in April and July of 2001 (SMUD 2001e; Fisk, 2001, respectively). Fisk's report is largely repeated in the AFC as Section 8.16, the other report was submitted as the confidential paleontology report (SMUD 2001e).

The archival search revealed no previously recorded fossil localities in the immediate project area. However, the Tertiary and Quaternary formations that underlie the CPP site are known to contain land mammal fossils in other locations (SMUD 2001a, Section 8.16.3.7). Land mammal fossils are deemed scientifically and paleontologically important and significant according to SVP (1995) criteria. During the field survey, Dr. Fisk found fossil remains at several locations at and in the vicinity of the proposed project site. Dr. Fisk concluded that the stratigraphic units present at the CPP site all qualify as high sensitivity and that there is a high potential for finding fossil remains similar to those found in the vicinity at other, established fossil sites (SMUD 2001a, § 8.16.3.7.4).

The following fossiliferous units are known to be present at the CPP site (SMUD 2001a, Section 8.16.3.7):

- Laguna Formation (Pliocene age) – high sensitivity, potential for scientifically important and significant finds during construction.
- Riverbank Formation (Pleistocene age) - known to contain fossil vertebrates; high sensitivity, high probability of adverse impacts on paleontological resources resulting from ground disturbance during construction.
- Modesto Formation (Pleistocene to Holocene age) – high sensitivity.

The proposed CPP site has a high paleontologic sensitivity. Proposed mitigation measures include paleontological resource monitoring during any project-related ground-disturbing activity, emergency discovery procedures, sampling and data

recovery, museum storage of recovered specimens or data, pre-construction coordination, and reports.

SITE SPECIFIC IMPACTS

Excavations, drilling, clearing and brushing operations, and grading of the fill and alluvium at the CPP site associated with construction of the project are considered to present a potential impact to paleontological resources. The site was deemed paleontologically highly sensitive by Dr. Lanny H. Fisk (SMUD 2001a, §8.16.3; Fisk 2001). Monitoring of excavations during project construction may reveal paleontological resources through recovery of fossils that would not have been normally exposed. The adoption and implementation of the proposed **Conditions of Certification PAL-1 through PAL-7** should mitigate any potential adverse impacts to paleontological resources, should such resources be encountered during construction of the project.

No known geological, mineralogical, or paleontological resources would be significantly impacted by the construction and operation of the proposed project.

CUMULATIVE IMPACTS

It is staff's opinion that the potential for significant adverse cumulative impacts on paleontological resources or geological resources is low if the CPP is constructed in accordance with the proposed conditions of certification. This opinion is based on the fact that the site is not known to have significant geological or mineralogical resources and adequate procedures would be in place to recover significant fossils if and when they are found.

There are no geological hazards at or in the vicinity of the CPP site; therefore, the construction of the CPP project would not result in a cumulative impact to the region with respect to geological hazards.

FACILITY CLOSURE

A definition and general approach to closure is presented in the **General Conditions** section of this document. Facility closure activities are not anticipated to impact geological or paleontological resources. This is due to the fact that no geological resources are known to exist at the power plant location and that closure would not involve additional ground disturbance that would impact the paleontological resources.

CONCLUSION AND RECOMMENDATIONS

Based upon the literature and archives search, field surveys, and the preliminary geotechnical investigation for the project, SMUD has proposed monitoring and mitigation measures to be followed during the construction of the power plant facilities. Energy Commission staff agree with SMUD that there is a high probability that vertebrate fossils would be encountered during construction of the power plant and related facilities and that vigilant mitigation measures should be taken to preserve this resource.

The proposed **Conditions of Certification** are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geological hazards and geological, mineralogical, and paleontological resources for the project.

The applicant will likely be able to comply with applicable LORS. The project should have no adverse impact with respect to geological, mineralogical, and paleontological resources and the impacts of the geologic hazards on project facilities should be less than significant, if the design and construction of all project facilities comply with the applicable LORS. Staff proposes to ensure compliance with the LORS for geological hazards and geological and paleontological resources with the adoption of the proposed **Conditions of Certification** listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section. **PAL-1 through PAL-7** below provide mitigation for impacts to paleontological resources.

PAL-1 The project owner shall provide the CPM with the resume and qualifications of its Paleontological Resource Specialist (PRS) and Paleontological Resource Monitors (PRMs) for review and approval. If the approved PRS or one of the PRMs is replaced prior to completion of project mitigation and report, the project owner shall obtain CPM approval of the replacement.

The resume shall include the names and phone numbers of contacts. The resume shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontologists (SVP) guidelines of 1995. The experience of the PRS shall include the following:

- 1) institutional affiliations or appropriate credentials and college degree;
- 2) ability to recognize and recover fossils in the field;
- 3) local geological and biostratigraphic expertise;
- 4) proficiency in identifying vertebrate and invertebrate fossils;
- 5) publications in scientific journals; and

- 6) the PRS shall have at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The PRS shall obtain qualified paleontological resource monitors to monitor as necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

- 1) BS or BA degree in geology or paleontology and one year experience monitoring in California; or
- 2) AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
- 3) Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM for approval. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would normally be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the PRS shall consult weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings.

If there are changes to the footprint of the project, revised maps and drawings shall be provided at least 15 days prior to the start of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The PRS shall prepare, and the project owner shall submit to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of the Vertebrate Paleontologists (SVP, 1995) and shall include, but not be limited to, the following:

- 1) Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation will be performed according to the PRMMP procedures;
- 2) Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and all conditions for certification;
- 3) A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
- 4) An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

- 5) A discussion of the locations where the monitoring of project construction activities is deemed necessary, and a proposed schedule for the monitoring;
- 6) A discussion of the procedures to be followed in the event of a significant fossil discovery, including notifications;
- 7) A discussion of equipment and supplies necessary for recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
- 8) Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontologists standards and requirements for the curation of paleontological resources;
- 9) Identification of the institution that has agreed to receive any data and fossil materials recovered, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and,
- 10) A copy of the paleontological conditions of certification.

Verification: At least thirty (30) days prior to ground disturbance, the project owner shall provide a copy of the PRMMP. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all project managers, construction supervisors and workers who operate ground disturbing equipment or tools (the Worker Environmental Awareness Program or WEAP). Workers to be involved in ground disturbing activities in sensitive units shall not operate equipment prior to receiving worker training. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

The WEAP shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources. In-person training shall be provided for each new employee involved with ground disturbing activities, while these activities are occurring in highly sensitive geologic units, as detailed in the PRMMP. The in-person training shall occur within four days following a new hire for highly sensitive sites and as established by the PRMMP for sites of moderate, low, and zero sensitivity. Provisions will be made to provide the WEAP training to workers not fluent in English.

The training shall include:

- 1) A discussion of applicable laws and penalties under the law;
- 2) For training in locations of high sensitivity, the PRS shall provide good quality photographs or physical examples of vertebrate fossils that may be expected in the area;
- 3) Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
- 4) Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
- 5) An informational brochure that identifies reporting procedures in the event of a discovery;
- 6) A Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and
- 7) A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP including the brochure with the set of reporting procedures the workers are to follow.

At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval. Alternate trainers shall not conduct training prior to CPM authorization.

The project owner shall provide in the Monthly Compliance Report the WEAP copies of the Certification of Completion forms with the names of those trained and the trainer for each training offered that month. The Monthly Compliance Report shall also include a running total of all persons who have completed the training to date.

PAL-5 The PRS and PRM(s) shall monitor consistent with the PRMMP, all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified. In the event that the PRS determines full time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the PRS shall notify and seek the concurrence of the CPM.

The PRS and PRM(s) shall have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

- 1) Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter from the PRS and the project owner to the CPM prior to the change in monitoring. The letter shall include the justification for the change in monitoring and submitted to the CPM for review and approval.
- 2) PRM(s) shall keep a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
- 3) The PRS shall immediately notify the project owner and the CPM of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.
- 4) For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM immediately (no later than the following morning after the find, or Monday morning in the case of a weekend) of any halt of construction activities.

The PRS shall prepare a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports. The summary will include the name(s) of PRS or monitor(s) active during the month; general descriptions of training and construction activities and general locations of excavations, grading, etc. A section of the report will include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of fossils identified in the field. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the project shall include a justification in summary as to why monitoring was not conducted.

Verification: The PRS shall submit the summary of monitoring and paleontological activities in the Monthly Compliance Report.

PAL-6 The project owner, through the designated PRS, shall ensure the recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in their compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved PRR. The project owner shall be responsible to pay curation fees for fossils collected and curated as a result of paleontological monitoring and mitigation.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the recovered fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but not be limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated.

Verification: Within ninety (90) days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover.

Certification of Completion

Worker Environmental Awareness Program

Cosumnes Power Plant (Docket #01-AFC-19)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology & Biology Resources for all personnel (i.e., construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Please include this completed form in your Monthly Compliance Report.

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Cul Trainer: _____ Signature: _____ Date: ____/____/____

PaleoTrainer: _____ Signature: _____ Date: ____/____/____

Bio Trainer: _____ Signature: _____ Date: ____/____/____

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POWER PLANT EFFICIENCY

Steve Baker

INTRODUCTION

The Energy Commission is required to make a finding as to whether energy use by the Cosumnes Power Plant (CPP) will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the CPP's consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

STATE

California Environmental Quality Act Guidelines

CEQA Guidelines state that the environmental analysis "...shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient, and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient and unnecessary consumption of energy (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

LOCAL

No local or county ordinances apply to power plant efficiency.

SETTING

SMUD proposes to construct and operate the 1,000 MW (nominal gross output) combined cycle CPP to generate baseload and load following power, providing power to SMUD customers and selling energy via contract or on the spot power market (SMUD 2001a, AFC §§ 1.1, 2.1, 2.2.16, 9.5.1, 10.2.2). (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.) The CPP would consist of four General Electric (GE) Frame 7FA combustion gas turbines with inlet air fogging, four multi-pressure heat recovery steam generators (HRSGs), and two three-pressure, reheat, condensing steam turbine generators, arranged in a pair of two-on-one combined cycle trains, totaling approximately 1,000 MW. The gas turbines and HRSGs will be equipped with dry low-NO_x combustors and selective catalytic reduction to control air emissions (SMUD 2001a, AFC §§ 1.1, 2.1, 2.2.2, 2.2.3, 2.2.4.1, 2.4.2.1.1). Natural gas will be delivered from the existing Pacific Gas & Electric (PG&E) gas transmission Lines 400 and 401 via SMUD's existing Line 700 natural gas pipeline, and a new 26-mile segment of 24-inch diameter pipeline extending from Line 700's current terminus at the Carson Ice-Gen cogeneration plant to the CPP project site (SMUD 2001a, AFC §§ 1.1, 2.1, 2.4.3, 6.0, 6.1, 10.2.1).

ANALYSIS

ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient, and unnecessary consumption of fuel or energy.

Project Energy Requirements and Energy Use Efficiency

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Under normal conditions, the CPP will burn natural gas at a nominal rate of 6.8 billion Btu per hour, lower heating value (LHV) (SMUD 2002a, Data Response 153). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 55.1 percent LHV with no duct burning (SMUD 2001a, AFC Figure 2.2-4); compare this to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV.

Adverse Effects On Energy Supplies and Resources

Natural gas for the CPP would be supplied from the existing PG&E system via PG&E's Lines 400 and 401 near Winters, CA. Lines 400 and 401 are capable of providing the

required quantity of gas to the CPP (SMUD 2001a, AFC §§ 1.1, 2.1, 2.4.3, 6.0, 10.2.1). Furthermore, the PG&E gas supply infrastructure is extensive, offering access to vast reserves of gas. This source represents far more gas than would be required for a project this size. It is therefore highly unlikely that the project could pose a substantial increase in demand for natural gas in California.

Additional Energy Supply Requirements

Natural gas fuel would be transported to the project from PG&E's existing lines 400 and 401 via SMUD's existing 51-mile, 20-inch diameter Line 700 gas pipeline that terminates at the Carson Ice-Gen cogeneration plant, then through a new 26-mile, 24-inch diameter pipeline to the CPP site (SMUD 2001a, AFC §§ 1.1, 2.1, 2.4.3, 6.0, 6.1, 10.2.1). In order to maintain adequate pressure in the SMUD-owned pipelines, gas compressor stations will be required where Line 700 taps into the PG&E lines near Winters, and where the new line originates adjacent to the Carson Ice-Gen plant (SMUD 2002a, Data Response 89). This would provide an adequately reliable connection to the PG&E gas supply system. There is no real likelihood that the CPP will require the development of additional energy supply capacity.

Compliance With Energy Standards

No standards apply to the efficiency of the CPP or other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient and Unnecessary Energy Consumption

The CPP could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The CPP would be configured as a combined cycle power plant, in which electricity is generated by four gas turbines, and additionally by two reheat steam turbines that operate on heat energy recuperated from the gas turbines' exhaust (SMUD 2001a, AFC §§ 1.1, 2.1, 2.2.2, 9.4). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or steam turbines operating alone. Such a configuration is well suited to the large, steady loads met by a baseload plant, intended to supply energy efficiently for long periods of time.

The dual two-train gas turbine/HRSG configuration also allows for high efficiency during unit turndown because one gas turbine generator can be shut down, leaving one fully loaded, efficiently operating gas turbine generator instead of having two, each operating at an inefficient 50 percent load.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. Currently available, large combustion turbine models can be grouped into three categories; conventional, advanced, and next generation. Advanced combustion turbines offer significant advantages for the CPP. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run time in commercial operation. Emission levels are also proven, and guaranteed emission levels have been reduced based on operational experience and design optimization by the manufacturers. The F-class of advanced gas turbines to be employed in the CPP represent some of the most modern and efficient machines now available. The applicant will employ four General Electric (GE) Frame 7FA gas turbine generators in dual two-on-one combined cycle power trains (SMUD 2001a, AFC §§ 1.1, 2.1, 2.2.2, 2.2.4, 9.4). This configuration is nominally rated at 1,060 MW and 56.5 percent efficiency LHV at ISO conditions (GTW 2000). The machines would be installed in two phases, each comprising one two-on-one combined cycle train. Plant efficiency will remain the same with either or both phases in operation.

One possible alternative machine is the Alstom Power ABB KA24, a gas turbine nominally rated at 260 MW with an identical efficiency rating of 56.5 percent LHV at ISO conditions (GTW 2000).

Another alternative is the Siemens-Westinghouse 501F, nominally rated in a dual two-on-one train combined cycle configuration at 1,100 MW and 55.8 percent efficiency LHV at ISO conditions (GTW 2000).

Any differences among the GE 7FA, ABB KA24, and W501F in actual operating efficiency will be insignificant. Selecting among these machines is thus based on other factors, such as generating capacity, cost, commercial availability, and ability to meet air pollution limitations. The ABB machine, for instance, is available only in one-on-one power trains, with one gas turbine and one steam turbine paired on a single shaft, generating a nominal 260 MW. The GE and Siemens-Westinghouse machines, which can be configured more flexibly, offer an advantage.

Efficiency Of Alternatives To The Project

The project objectives include generation of baseload or load following electricity for SMUD's customers, with excess capacity to be sold via contract or on the spot market, as market conditions dictate (SMUD 2001a, AFC §§ 1.1, 2.2.16, 2.4.1, 9.5.1, 10.2.2, 10.3).

Alternative Generating Technologies

Alternative generating technologies for the CPP are considered in the AFC (SMUD 2001a, AFC §§ 1.4, 9.4, 9.5). Fossil fuels, nuclear, solar, biomass, hydroelectric, geothermal, municipal solid waste, ocean energy conversion, and windpower are all considered. Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Recent progress in the development of large, stationary gas turbines, aided by the incorporation into these machines of technological advances made in the development of aircraft (jet) engines, has created a situation in which several large manufacturers compete vigorously to sell their machines. This, combined with the cost advantages of assembly line manufacturing, has driven down the prices of these machines. Thus, the power plant developer can purchase a turbine generator that not only offers the lowest available fuel costs, but at the same time sells for the lowest per-kilowatt capital cost.

One possible alternative to an F-class gas turbine is a next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which employs partial steam cooling to allow slightly higher temperatures, yielding rated efficiency of 58.0 percent (GTW 2000). The 501G is still relatively new; the first such machines began operation in April, 2001 at Lakeland (Florida) Electric and Water's McIntosh Power Plant, and at PG&E National Energy's Millennium project in Charlton, Massachusetts (GTW 2001). Given the minor efficiency improvement promised by the G-class turbine and the lack of a proven track record for the 501G, the applicant's decision to purchase F-class machines is a reasonable one.

Another possible next generation alternative to the F-class gas turbine is an H-class machine with a claimed fuel efficiency of 60 percent LHV at ISO conditions (GTW 2000). This high efficiency is achieved through a higher pressure ratio and higher firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is not expected to enter service until the end of 2002 at Sithe Energy's Heritage Station in Scriba, NY (ME 2002). Given the lack of proven performance, staff agrees with the applicant's decision to employ F-class machines.

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler or fogger, and the chiller; both devices increase power output by cooling the gas turbine inlet air. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ inlet air fogging (SMUD 2001a, AFC §§ 2.2.3, 2.2.4.1, 2.4.2.1.1, 7.1). Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (combined cycle) and generating equipment ("F-class" gas turbines) chosen appear to represent the most efficient combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

There are no nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project will not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the project. The older, less efficient power plants consume more natural gas to operate than the new, more efficient plants such as the CPP. Since natural gas will be burned by the power plants that are most competitive on the spot market, the most efficient plants will run the most. The high efficiency of the proposed CPP should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants in the market, and therefore not impacting or even reducing the cumulative amount of natural gas consumed for power generation.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, would not influence, nor would it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator to ensure the efficient management of the system, all lend assurance that closure of this facility would not produce significant adverse impacts on efficiency.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate a nominal 1,000 MW of electric power at an overall project fuel efficiency of approximately 55.1 percent LHV. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

CONDITIONS OF CERTIFICATION

No Conditions of Certification are proposed.

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POWER PLANT RELIABILITY

Steve Baker

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the Cosumnes Power Plant (CPP) is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While SMUD has predicted a 92 to 98 percent availability for the Cosumnes Power Plant Project (see below), staff uses the benchmark identified above, rather than SMUD's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Presently, there are no laws, ordinances, regulations, or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, the commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system (see **Setting** below).

SETTING

In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a seven- to ten-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from seven- to ten-percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), an entity that purchases, dispatches, and sells electric power throughout the state. How Cal-ISO will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms being employed to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.).

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO (Detmers 1999, pers. comm.).

The Cal-ISO’s mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

SMUD proposes to operate the 1,000 MW (nominal output) Cosumnes Power Plant (CPP), providing power to SMUD’s customers and selling excess energy via contract or on the spot power market (SMUD 2001a, §§ 1.1, 2.1, 2.2.16, 9.5.1). The project is expected to operate at an overall availability in the range of 92 to 98 percent (SMUD 2001a, §§ 2.2.2, 2.2.16, 2.4.1, 10.2.2), and at a capacity factor, over the life of the plant, of 92 percent of base load (SMUD 2001a, § 10.3).

ANALYSIS

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when

called upon to operate. Throughout its intended 30-year life (SMUD 2001a, §§ 2.4.1, 10.2.2), the CPP will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the CPP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

SMUD describes a QA/QC program (SMUD 2001a, §§ 2.4.5, 2.4.5.2) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in baseload service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

SMUD plans to provide appropriate redundancy of function for the project (SMUD 2001a, §§ 2.2.5.3, 2.2.5.4, 2.2.13.3, 2.4.2; Table 2.4-1). The fact that the project consists of four trains of gas turbine generators/HRSGs and two steam turbine generators and condensers provides inherent reliability. Failure of a non-redundant component of one train should not cause the other train to fail, thus allowing the plant to continue to generate (at reduced output). Further, the plant's distributed control system (DCS) will be built with typical redundancy. Emergency DC and AC power systems will be supplied by redundant batteries, chargers, and inverters. Other balance of plant equipment will be provided with redundant examples, thus:

- two 100 percent boiler feed water pumps per HRSG;
- three 50 percent condensate pumps per condenser;
- three 50 percent circulating water pumps per condenser;

- four 100 percent auxiliary cooling water pumps; and
- two 100 percent air compressors.

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

SMUD proposes to establish a preventive plant maintenance program typical of the industry (SMUD 2001a, §§ 2.4.1, 2.4.5.2, 6.5, 10.2.2). SMUD's operating experience with its three existing cogeneration power plants lends confidence that the maintenance plan developed for the CPP will result in a plant adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The CPP will burn natural gas from the Pacific Gas and Electric Company (PG&E) gas transmission system. Gas will be transmitted from PG&E's Lines 400 and 401 near Winters, CA, to the plant via SMUD's existing 51-mile, 20-inch diameter Line 700 and a new 26-mile, 24-inch diameter pipeline connecting the existing Carson Ice-Gen cogeneration plant to the CPP site (SMUD 2001a, §§ 1.1, 2.1, 2.4.3, 6.0, 6.1, 10.2.1). New gas compressor stations near Winters and adjacent to the Carson Ice-Gen plant will maintain sufficient pressure in the SMUD lines (SMUD 2002a, Data Response 89). The PG&E natural gas system represents a resource of considerable capacity. This system offers access to adequate supplies of gas (SMUD 2001a, § 2.4.3). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The CPP will obtain water from the federal Bureau of Reclamation via the Folsom-South Canal for plant cooling, process makeup, general plant service, stored firewater and potable water needs (SMUD 2001a, §§ 1.1, 2.1, 2.4.4, 7.1, 7.4, 10.2.2; Appendix 7A). While this should provide an adequately reliable source of water, Energy Commission staff questions the propriety of using vast quantities of fresh water for cooling the project. Please see the **Soil and Water Resources** section of this document.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), and seiches (waves in inland bodies of water) will not likely

represent a hazard for this project, but flooding and seismic shaking (earthquake) present credible threats to reliable operation.

Flooding

The project site lies at an elevation of approximately 150 feet above mean sea level, and does not lie in either a 100-year or a 500-year floodplain (SMUD 2001a, §§ 2.3.1, 10.2.2). Staff believes that flooding presents no credible threat to the project.

Seismic Shaking

The site lies within Seismic Zone 3 (SMUD 2001a, § 2.3.1); see that portion of this document entitled **Geology, Mineral Resources, and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (SMUD 2001a, § 2.3.1; Table 10.4-1; Appendices 10B, 10G). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (<http://www.nerc.com>). NERC reports the following summary generating unit statistics for the years 1994 through 1998 (NERC 1999):

For Combined Cycle units (All MW sizes)

Availability Factor = 91.49 percent

The gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor in the 92 to 98 percent range (SMUD 2001a, §§ 2.2.2, 2.2.16, 2.4.1, 10.2.2) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new, large machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant will consist of four parallel gas turbine generator trains and two parallel steam turbine generators, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement, and

construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact power plant reliability. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in the **Transmission System Engineering** section of this document.

CONCLUSION

SMUD predicts an equivalent availability factor in the 92 to 98 percent range, which staff believes is achievable in light of the industry norm of 91.5 percent for this type of plant. Based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No Conditions of Certification are proposed.

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TRANSMISSION SYSTEM ENGINEERING

Henry Zaininger, Laiping Ng, and Al McCuen

INTRODUCTION

The Transmission System Engineering (TSE) analysis identifies whether the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. It also assesses whether the applicant has accurately identified all interconnection facilities required as a result of the project.

Staff evaluated the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant, and provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation, and potential closure of the project.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the “whole of the action,” that may include facilities not licensed by the Energy Commission (California Code of Regulations (CCR), Title 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project’s interconnection to the electric grid and also beyond the project’s interconnection with the existing transmission system that are required as a result of the power plant addition to the California transmission system.

Sacramento Municipal Utility District (SMUD) filed an Application for Certification to the California Energy Commission to construct a nominal 1,000 megawatt (MW) natural gas-fired generating facility to be located about 0.5 mile south of the Rancho Seco Nuclear Plant in Sacramento County, 25 miles southeast of the city of Sacramento. The applicant proposes to locate their project, the Cosumnes power Plant (CPP) on a 30-acre area, which is part of the 2,480 acres owned by the SMUD. The CPP would be constructed in two phases, each consisting of 500 MW. The first phase is to be installed in the first quarter of 2005, and the second phase is proposed to be installed two years later in 2007. Each phase would have two combustion turbines, one condensing steam turbine, and two heat recovery steam generators. The transmission line would consist of about 0.4 miles of new 230-kV line from the proposed CPP on-site switchyard to the existing switchyard at the Rancho Seco plant. Because the SMUD system is not a part of the California Independent System Operator (Cal-ISO) grid, the Cal-ISO is not directly responsible for ensuring electric system reliability for the generator interconnection and does not provide analysis and testimony in the Commission’s process. The staff therefore has increased responsibility to evaluate the system reliability impacts of the project and provide conclusions and recommendations to the Commission.

This analysis is provided in support of the Commission's consideration of a license for the first 500 MW phase. Once the additional needed data is identified and provided, staff will draft a complete Final Staff Assessment (FSA) for this phase, including any

needed conditions of certification to address impacts. Staff will also include a general discussion of potential impacts associated with the second 500 MW phase of the project in the FSA. However, because the actual impacts of the second phase will depend on both its exact timing and the status of other projects that are currently uncertain, it would be premature to reach any final conclusions about the second phase in this part of the proceeding. Therefore, a precise identification of impacts and mitigation measures for the second 500 MW will be provided during the AFC proceeding for the second phase of the project.

SUMMARY OF CONCLUSIONS

During the past two years, several other projects have been proposed for the Sacramento area. However, the status of these projects is uncertain complicating staff's determination of the appropriate scope of analysis for the project. Staff needs additional information to establish the most appropriate parameters for evaluating downstream impacts, transmission facilities and/or mitigation measures required for the reliable operation of the electrical transmission system. Staff's preliminary analysis however, indicates that there are no significant system reliability criteria violations under normal operation of the 500 MW CPP initial stage of the project. We anticipate securing sufficient information and completing staff's analysis in time for inclusion in the Final Staff Assessment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction", formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation, or use of overhead electric lines and to the public in general.
- Western Systems Coordinating Council (WSCC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria include the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).

- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. The NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Cal-ISO's Reliability Criteria also provide policies, standards, principles, and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid. It also applies when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO.

PROJECT DESCRIPTION

The CPP would be constructed in two phases, each consisting of a nominal 500 MW generating capacity. The first phase is to be installed in the first quarter of 2005, and the second phase is proposed to be installed two years later in 2007. At buildout, the generating facility would consist of four combustion turbines (CTG), two condensing steam turbine (STG), and four heat recovery steam generators (HRSG) providing a nominal total generating capacity of 1,000 MW (SMUD 2001a, pages 2-1 and 2-2).

The applicant would use General Electric 7FA combustion turbines for the CTGs. Each CTG would generate approximately 170 MW at baseload under average ambient conditions. The CTG exhaust gases would be used to generate steam in the HRSGs. No duct firing would be used. Steam from the HRSGs would be admitted to a condensing steam turbine generator. Approximately 190 MW would be produced by the steam turbine when the CTGs are operating at base load at average ambient conditions.

CPP SWITCHYARD

The four CTGs and two STGs would each be connected to a dedicated 3-phase 18/230 kV step-up transformer that would be connected to the plant's 230-kV switchyard (SMUD 2001a, pages 2-5 and 5-7, Figures 2.2-5, 5.3-2, and 5.3-3). A new 0.4-mile 230-kV double-circuit transmission line would interconnect the plant's switchyard bus with that of the existing Rancho Seco Plant substation. The applicant would own and operate both switchyards and the transmission outlet.

Supplement B of the AFC (SMUD 2002p) modifies the CPP switchyard arrangement to accommodate three circuits between the CPP switchyard and the Rancho Seco Plant

switchyard as shown in SMUD 2002p, Figure 1-9. The CPP switchyard would consist of eleven, 230-kV SF6 insulated circuit breakers and manually operated disconnect switches on each side of each breaker. A breaker-and-a-half arrangement would be used in the switchyard to obtain a high level of service reliability. The switchyard and all equipment would be designed for a 63-kiloampere (kA) interrupting capacity. The main buses would be designed for 4,000-amp continuous current. The bays would be designed for 2,000-amp continuous current. Strain bus would be used for the main buses. Either rigid aluminum bus structures or strain bus structures would be used for the interconnecting buses in the bays. Each generator would be provided with an independent tie to the switchyard.

TRANSMISSION LINE

In its October 16, 2001 Transmission System Impact Study (SIS), SMUD proposed to connect the CPP to the SMUD transmission system by constructing two new overhead lines on dual line monopole tower structures extending approximately 0.4 mile from the CPP switchyard to the existing Rancho Seco Plant (RSP) switchyard (SMUD 2001a, page 5-8, Figure 5.3-1).

The 230-kV interconnecting transmission lines were proposed to be carried on double-circuit single-pole steel structures. Each of the circuits were to be sized for 1,500 megavolt amperes (MVA) – enough capacity to deliver the full CPP 1,000 MW plant output into the existing 230 kV transmission system at the RSP with the other circuit out of service. The double circuit line was to exit the CPP switchyard and align due north, parallel to and approximately 80 feet to the east of the existing PG&E easement, for approximately 0.3 mile, where it was to bear northeast 0.1 mile toward the dead-end structure at the south end of the Rancho Seco Plant switchyard.

The overhead transmission line was proposed to use self-supporting tubular steel pole structures to hold the conductors (SMUD 2001a, page 5-8, Figures 5.3-4a and 5.3-4b). The steel poles were proposed to be 100 to 125 feet tall (125 feet maximum). Each circuit was to exit the CPP switchyard in a slack-span configuration from the dead-end structures. The maximum height of the dead-end structure was to be 85 feet.

Supplement B of the AFC (SMUD 2002p) modifies the CPP to the RSP transmission plan. Originally, one double circuit transmission line was planned requiring one set of three transmission poles between the CPP switchyard and the RSP switchyard. In Supplement B, SMUD proposed three overhead circuits would be constructed between the CPP switchyard and the RSP switchyard. The circuits would be carried on one set of double-circuit steel pole structures and one set of single-circuit single pole structures. The route of the lines is shown in **Project Description Figure 7**.

Because the total output of the CPP switchyard is expected to be in the range of 3,000 to 4,000 amps, at least 2 of the 3 lines must be in service to transmit the full capacity of the facility to the RSP switchyard. If one circuit is out for maintenance, or should one circuit fail, the remaining two circuits would not be subject the plant to an operational limitation.

The RSP switchyard currently has three existing positions that can accept the three lines from CPP, requiring no modification to the existing switchyard structure as shown in SMUD 2002p, Figures 1-10 and 1-11. The existing breaker ratings at the RSP switchyard vary from 2,000 amps to 3,000 amps. These existing RSP breaker ratings are compatible with the 2,000 amp continuous current ratings of the eleven breakers at the CPP switchyard.

The circuit ratings, tower types, and configurations for the proposed three transmission circuits between the CPP switchyard and the RSP switchyard are not specified in Supplement B. These data must be provided as part of the facilities study.

EXISTING FACILITIES AND RELATED SYSTEMS

The CPP would deliver power into the Northern California region transmission system at the existing RSP substation as shown in SMUD 2001a, Figure 5.1-1. Three existing 230 kV double circuit lines connect the RSP switching station into the Northern California region transmission system. Two SMUD 230-kV double circuit transmission lines connect the RSP substation to the SMUD transmission system. These SMUD lines originate at the RSP switchyard and continue in a westerly direction. In the city of Elk Grove, one double circuit line turns north and connects to the Elk Grove substation, then continues again northward to the Hedge substation. The second double circuit line runs farther west after Elk Grove, then turns north at the town of Franklin where it connects to the Pocket substation. The third PG&E 230-kV double circuit transmission line originates at the RSP switchyard and runs southerly to the Bellotta substation. Currently, SMUD generates about 30% of its total load and imports power for the remaining 70% during heavy summer season.

ANALYSIS

SYSTEM RELIABILITY

Introduction

A System Impact Study for connecting a new power plant to the existing power system grid is performed to determine the alternate and preferred interconnection facilities to the grid, downstream transmission system impacts, and mitigation measures to conform with system performance levels as required in Utility reliability criteria, NERC planning standards, WSCC reliability criteria, and Cal-ISO reliability criteria. The study determines both positive and negative impacts, and for the reliability criteria violation cases (for the negative impacts) determines the alternate and preferred additional transmission facilities or other mitigation measures. The study is conducted with and without the new generation project and its interconnection facilities by using the computer model base case for the year the generator project would come on-line. The study normally includes a Load Flow study, Transient Stability study, Post-transient Load Flow study, and Short Circuit study. The study is focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), and short circuit duties. The study must be conducted under the normal condition (N-0) of the system and also for all credible contingency/emergency conditions, which includes the

loss of a single system element (N-1) such as a transmission line, transformer, or a generator and the simultaneous loss of two system elements (N-2), such as two transmission lines or a transmission line and a generator. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power is available in the area system or area sub-system to which the new generator project would be interconnected. The SIS is followed by supplemental studies conducted by the transmission owner with details provided in a Final Facility Study (FS).

Any new transmission facilities such as a power plant switchyard, the outlet line, and downstream facilities required for connecting a project to the grid are considered part of the project and are subject to the Application for Certification review process in accordance with CEQA.

Transmission System Impact Study/Transmission System Impact Sensitivity Study Summary

Thermal contingency analysis was performed in the SIS [SMUD 2001d] with and without CPP for 2005 heavy summer and spring conditions. No significant negative impacts with CPP operating at 1,000 MW were identified for heavy summer normal and contingency operation conditions, with or without the Rio Linda/Elverta plant¹ (01-AFC-1) operating at 560 MW. Thus, adding the first 500 MW phase of CPP would not cause overloads.²

The following adverse impacts due to overloads with CPP operating at 1,000 MW on-line were identified for light spring conditions:

- Under normal conditions with no outages, without the Rio Linda/Elverta project on line, and with the CPP operating at 1,000 MW, the flow on the Riverbank Junction to Manteca 115 kV line increases to 100.1% of its normal rating, as shown in Table 15 of the SIS. With the Rio Linda/Elverta plant operating at 560 MW and the CPP operating at 1,000 MW, the overload increases to 106.9% of its normal rating, as shown in Table 16 of the SIS. The SIS states that a generation reduction at either CPP or Rio Linda/Elverta totaling 500 MW would alleviate this overload. Thus adding the first 500 MW phase of CPP would not cause an overload of this line.
- If the Westley-Tesla 230 kV line is out (N-1), without the Rio Linda/Elverta project and the CPP project online, then the Westley-Tracy 230 kV line overloads to 126.7% of its normal rating. The addition of the CPP generating at 1,000 MW and without the Rio Linda/Elverta project, then the Westley-Tracy 230 kV line overloads to 135.4% of its normal rating. With both the CPP and the Rio Linda/Elverta projects generating at their full capacity, then the Westley-Tracy 230 kV line overloads to 143.1% of its normal rating. (SMUD 2001d, Section 11.2). Interpolating these

¹ The Rio Linda/Elverta Power Project is a proposed 560 MW power plant currently under review by the Energy Commission.

² Although staff is analyzing the CPP project for both 500 and 1000 MW output, because system conditions in 2007 are highly uncertain, staff recommends only approval of the first 500 MW. Realistically, full build-out may even be later. See General Conditions of Certification section 7-1 for the preliminary Conditions of Certification.

results, adding the first 500 MW phase of the CPP would also tend to increase the existing overload of this line.

- The Hurley to Proctor, Hedge to Proctor, Westley to Tracy, and both Hurley to Tracy 230 kV Western Area Power Authority (Western) lines overload for a double contingency outage of both Rancho Seco to Bellotta 230 kV lines with and without Rio Linda/Elverta Plant when CPP is operated at 1,000 MW as shown in Tables 17 and 18 of the SIS. These overloads are not a concern when the first 500 MW phase of CPP is added as summarized on Page 15 of the SIS.

In summary, no significant adverse impacts due to overloads during heavy summer or spring normal operation conditions were identified when the first 500 MW phase of CPP is added.

The October 16, 2001 SIS states that more than 90 line and transformer outages were studied as part of the contingency (N-1 and N-2 conditions) analysis. A contingency list of outages studied is not included in the report, although some outage contingencies are listed. None of the outage contingencies listed in the report are of 500 kV transmission facilities. It is not clear whether outages of 500 kV transmission system facilities in the vicinity have been considered as part of this SIS. If it is not considered, a contingency analysis of appropriate 500 kV line and transformers should be evaluated with and without the 500 MW CPP, and any resulting overloads mitigated. Staff will provide a list of candidate 500 kV contingencies to SMUD in the near future.

The October 16, 2001 SIS did not contain a stability study or a fault duty impact study. As requested by staff, SMUD submitted Data Response Set 4A dated May 10, 2002 (SMUD 2002ad) which included a stability study, a fault duty impact study, and a voltage support sensitivity study.

The stability study results (SMUD 2002ad) indicate no stability criteria violations would occur with 1,000 MW added at CPP. Thus, adding the first 500 MW phase of CPP would not cause stability criteria violations.

The fault duty impact study results (SMUD 2002ad, Table 1), show that without the Rio Linda/Elverta Power Project, Roseville Energy Facility Project (01-AFC-14), Colusa Power Plant Project (01-AFC-10) (which has been withdrawn by the applicant), and East Altamont Energy Center Project (01-AFC-4) (proposed power plants in Northern California currently being reviewed by the Energy Commission), adding the first 500 MW phase at CPP causes fault currents at the Hedge circuit breakers (#54 and #60) to exceed breaker fault duty capability. These two breakers would need to be replaced before the first 500 MW phase is added at CPP³. When 1,000 MW is added at CPP, fault currents at seven Hedge circuit breakers exceed breaker fault duty capability, and must be replaced.

The fault duty impact study results (SMUD 2002ad, Table 2) show cumulative impacts with Rio Linda/Elverta Power Project, Roseville Energy Facility, and East Altamont

³ Because breaker replacement occurs within a substation's fence line, staff preliminarily concludes there would be no environmental impacts.

Energy Center Project. In this case, adding the first 500 MW phase at CPP causes fault currents at seven Hedge circuit breakers to exceed breaker fault duty capability. In this case, these seven breakers would need to be replaced before the first 500 MW phase is added at CPP. In addition, fault currents at three Elverta - SMUD circuit breakers exceed fault duty capability without adding any generation at CPP. These breakers would have to be replaced without any generation being added at CPP.

A Sacramento Area voltage support study was performed as part of the SIS (SMUD 2001d) and a further sensitivity analysis was performed in Data Response Set 4A (SMUD 2002ad). Both studies show that adding local generation at CPP tends to improve local area voltage support, and would not cause adverse voltage support impacts. The provision of dynamic voltage support in the SMUD area is considered a local system benefit by staff.

CUMULATIVE IMPACTS

Additional projects have also been proposed in the area. Currently, the Roseville Energy Facility (900 MW) and the Rio Linda/Elverta Power Project (560 MW) are being reviewed by the Energy Commission. The Rio Linda/Elverta Power project was included in the CPP SIS. However, the proposed Roseville Energy Facility generation project, which was to be on-line before CPP, was not included in the October 16, 2001 CPP SIS.

As requested by staff, SMUD also submitted a CPP Transmission System Impact Sensitivity Study dated January 25, 2002 (SMUD 2002e, Attachment TSE-86) to investigate cumulative impacts with the Roseville Energy Facility, Rio Linda/Elverta Power Project, and the Colusa Power Project. Thermal power flow analysis was performed during heavy summer and spring conditions with all four plants on-line at rated output.

The results of the sensitivity study (SMUD 2002e, Attachment TSE-86) show that there are significant negative cumulative impacts during both heavy summer and spring conditions when all four proposed generating plants are on-line at rated output. Subsequent to the submission of this SMUD sensitivity study, the Colusa Power Project has been removed from the siting process because it has been withdrawn by the applicant. This is expected to reduce the negative cumulative impacts shown in the January 25, 2002 sensitivity study.

In addition, on July 10, 2002, the Roseville Energy Facility submitted a revised SIS with significant changes in their proposed configuration. These recent changes are expected to have a significant effect on the magnitude of Sacramento area power flows and system impacts which were identified in the January 25, 2002 study results. These changes may also have an effect on fault currents calculated in Table 2 of the fault duty impact study (SMUD 2002ad) showing cumulative impacts with Rio Linda/Elverta Power Project, Roseville Energy Facility, and East Altamont Energy Center Project. This may have an impact on the number of breakers at Hedge that would need to be replaced when the first 500 MW phase is added at the CPP. These changes are not expected to cause any stability violations.

These uncertainties in potential cumulative impacts on SMUD, Western and PG&E systems with inclusion of the Roseville Energy Facility will need to be reviewed and resolved prior to completing the FSA. Staff will coordinate with SMUD, Western, and PG&E and secure additional information on cumulative impacts prior to the issuance of the FSA.

TRANSMISSION ALTERNATIVES

TRANSMISSION LINE ROUTE ALTERNATIVES

No transmission alternatives were investigated in the original AFC (SMUD 2001a). In Supplement B of the AFC (SMUD 2002p) SMUD proposes to build three lines, one single circuit and one double circuit line between CPP and the Rancho Seco Plant switchyard. Staff concludes this configuration is acceptable.

INTERCONNECTION ALTERNATIVES

In the original AFC (SMUD 2001a) two new 230 kV bays would be added to the Rancho Seco Plant switchyard to connect the two 230 kV circuits from CPP. In AFC Supplement B (SMUD 2002p), the three circuits from CPP are connected to existing Rancho Seco 230 kV switchyard bays. Staff concludes this configuration is acceptable.

FACILITY CLOSURE

PLANNED CLOSURE

Planned closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS, is considered sufficient to provide adequate safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the Transmission Owner (TO) to assure (as one example) that the TO's system would not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the transmission owner to maintain some power service via the outlet line to supply critical station service equipment or other loads.⁴

UNEXPECTED TEMPORARY CLOSURE

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (see **General Conditions Including Compliance Monitoring and Closure Plan**).

⁴ These are merely examples, many more exist.

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, would be developed to assure safety and reliability (see **General Conditions Including Compliance Monitoring and Closure Plan**).

RESPONSES TO PUBLIC COMMENTS ON THE PSA

No agency or public comments related to the TSE discipline have been referred to TSE staff for this case.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes the following:

- No significant criteria violations under normal operation of the 500 MW Cosumnes project would occur.
- No significant adverse impacts due to overloads during heavy summer or spring conditions were identified when the first 500 MW phase of the CPP is added.
- Adding local generation at the CPP tends to improve local area voltage support, and does not cause adverse voltage support impacts.
- Adding the first 500 MW phase of CPP would not cause stability criteria violations.
- Several breakers at Hedge would exceed fault duty ratings and would need to be replaced before the first 500 MW phase is added at CPP. The specific Hedge breakers to be replaced would be determined from the results of the final cumulative impact study to be completed for the final staff assessment.
- Some significant adverse impacts due to overloads during spring conditions were identified when 1,000 MW is added at CPP. Staff needs more specific information regarding proposed mitigation measures in order to complete the staff assessment for the full 1,000 MW Cosumnes Power Plant. These data should be provided using expected spring conditions in 2007 or other year when the second 500 MW phase is planned to be installed.
- Staff will not be recommending approval of the second 500 MW phase. The applicant must return to the Energy Commission with a completed SIS for the second 500 MW CPP unit considering the expected unit installation year (2007 or later) to secure approval.

- Pending receipt of additional reliability studies, staff provides the following preliminary Conditions of Certification. Because the power plant switchyard would be owned and operated by a Utility (SMUD) the following Conditions are different than what is typically recommended by staff for a private developer. This occurs because of SMUD's extensive expertise and their responsibility to provide safe and reliable facilities.

However, due to the uncertainties associated with the status of other generation projects in the area (Roseville Energy Facility and Rio Linda/Elverta Power Project), staff has not fully evaluated downstream impacts, transmission facilities, and/or mitigation measures required for the reliable operation of the electrical transmission system. Prior to filing the FSA, SMUD should submit the following information and analysis:

- Under all conditions, an assessment and evaluation of the 500 kV outages (N-1 and N-2 conditions). Identify mitigation measures required for system reliability criteria violations.
- Under light spring N-1 conditions and without Roseville Energy Facility and Rio Linda/Elverta Power Project, what is the overload on the Westley-Tracy 230 kV line with the 500 MW CPP.

Staff will work with SMUD to determine if additional studies that include the Roseville Energy Facility and Rio Linda/Elverta Power Project are needed.

CONDITIONS OF CERTIFICATION

- TSE-1** The owner of the power plant switchyard and outlet facilities shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS including the requirements 1a) through 1g) listed below. The substitution of Compliance Project Manager (CPM) approved "equivalent" equipment and an equivalent substation configuration is acceptable.
- a) The CPP switchyard shall consist of eleven, 230 kV SF6 insulated circuit breakers and manually operated disconnect switches on each side of each breaker. A breaker-and-a half arrangement shall be used in the switchyard.
 - b) The power plant switchyard and outlet lines shall meet or exceed the electrical, mechanical, civil, and structural requirements of Western interconnection standards, CPUC General Orders 95 (GO-95) or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations, Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders", National Electric Code (NEC) and related industry standards.
 - c) Breakers and buses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
 - d) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
 - e) Termination facilities at the plant switchyard shall comply with applicable SMUD interconnection standards.

- f) The project conductors shall be sized to accommodate the full output from the project.
- g) The owner of the power plant switchyard and outlet facilities shall provide:
 - i) Any modified Detailed Facility Interconnection Study (DFIS) including a description of facility upgrades, operational mitigation measures, and/or Remedial Action Scheme (RAS) or Special Protection System (SPS) sequencing and timing if applicable,
 - ii) A copy of the Notice to Cal-ISO prior to synchronization of the facility with the California transmission grid.

Verification: At least 60 days prior to the start of rough grading of transmission facilities, the owner of the power plant switchyard and outlet facilities shall submit to the CPM for approval:

- a) Electrical one line diagrams signed and sealed by a registered professional electrical engineer in responsible charge (or other approval acceptable to the CPM), a route map, and an engineering description of equipment and the configurations covered by the requirements 1a) through 1g) above.
- b) The Detailed Facilities Study (if modified) (if it is not otherwise provided to the Energy Commission previously) and a signed letter from the owner of the power plant Switchyard and Outlet facilities stating that the mitigation measures are acceptable, shall be provided to the CPM. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The owner of the power plant switchyard and outlet facilities shall inform the CPM of any impending changes that may not conform to the requirements 1a) through 1g) of **TSE-1**, and have not received CPM approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the owner of the power plant switchyard and outlet facilities shall inform the CPM of any impending changes that may not conform to requirements 1a) through 1g) of **TSE-1** and request approval to implement such changes.

TSE-3 The owner of the power plant switchyard and outlet facilities shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8 of the California Code of Regulations, Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders”, Western’s interconnection standards, NEC, related industry standards and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing, within 10 days of discovering such non-conformance, and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project to the grid, the owner of the power plant switchyard and outlet facilities shall transmit to the CPM an engineering description(s) and one-line diagrams of the “as built” facilities signed and sealed by the registered electrical engineer in responsible charge (or other verification acceptable to the CPM, such as a letter stating that the attached diagrams have been verified by the engineer). A statement attesting to conformance with CPUC GO-95 or NESC, Title 8 of the California Code of Regulations, Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders”, Western’s interconnection standards, NEC, related industry standards and these conditions.

REFERENCES

NERC (North American Electric Reliability Council). 1998. NERC Planning Standards, September 1997.

WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

SMUD (Sacramento Municipal Utility District) 2001a. Application for Certification, Volumes 1 and 2 (01-AFC-19). Submitted to the California Energy Commission on September 13, 2001. Docket date September 13, 2001.

SMUD (Sacramento Municipal Utility District) 2002e. Data Response, Set 1C. February 4, 2002. Docket date February 5, 2002.

SMUD (Sacramento Municipal Utility District) 2001d. Data Adequacy Supplemental Information for the SMUD Cosumnes Power Plant. November 13, 2001. Docket date November 16, 2001.

SMUD (Sacramento Municipal Utility District) 2002p. AFC Supplement B. April 15, 2002. Docket date April 15, 2002.

SMUD (Sacramento Municipal Utility District) 2002ad. Data Response, Set 4A – Response to Data Requests 254-257. May 10, 2002. Docket date May 10, 2002.

DEFINITION OF TERMS

AAC	All Aluminum conductor.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports), would not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
Kcmil or kcm	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Loop	An electrical cul de sac. A transmission configuration which interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
Megavar	One megavolt ampere reactive.
Megavars	Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt ampere (MVA)	A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)

A unit of power equivalent to 1,341 horsepower.

Multiple Contingencies

A condition that occurs when more than one major transmission element (circuit, transformer, circuit breaker, etc.) or more than one generator is out of service

Normal Operation/ Normal Overload

When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition

See Single Contingency.

Outlet

Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis

A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power

Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)

A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SF6

Sulfur hexafluoride is an insulating medium.

Single Contingency

Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable

Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard

A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating

See ampacity.

TSE

Transmission System Engineering.

Undercrossing

A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild

A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Jeri Scott

INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

1. The Compliance Plan is composed of elements that:
 - set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
 - set forth the requirements for handling confidential records and maintaining the compliance record;
 - state procedures for settling disputes and making post-certification changes;
 - state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and
 - establish requirements for facility closure plans.
2. Specific Conditions of Certification:
 - Specific Conditions of Certification that follow each technical area contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

GENERAL CONDITIONS OF CERTIFICATION

DEFINITIONS

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification.

SITE MOBILIZATION

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for the occupants. Site mobilization is for temporary facilities and is, therefore, not considered construction.

GROUND DISTURBANCE

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

GRADING

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

- a. the installation of environmental monitoring equipment;
- b. a soil or geological investigation;
- c. a topographical survey;
- d. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; or
- e. any work to provide access to the site for any of the purposes specified in a., b., c., or d.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” is that phase of project development which begins after the completion of start-up and commissioning, where the power plant has reached steady-state production of electricity with reliability at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

A Compliance Project Manager (CPM) will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and,
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval the approval will involve all appropriate staff and management.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Pre-Construction and Pre-Operation Compliance Meeting

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

Energy Commission Record

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
2. all monthly and annual compliance reports filed by the project owner;

3. all complaints of noncompliance filed with the Energy Commission; and
4. all petitions for project or condition changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

Access, Compliance Condition of Certification, COM-1

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record, COM-2

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Reporting of Unplanned Outages, COM-3

Throughout the life of the project, the project owner shall report all unplanned outages via e-mail to the Compliance Program Manager and to the CPM immediately. Contact shall be made as follows:

- Chuck Najarian, Compliance Program Manager
E-mail: cnajarian@energy.state.ca.us , telephone: (916) 654-4079
- Jeri Scott, Compliance Project Manager
E-mail: jscott@energy.state.ca.us, telephone: (916) 654-4228.

Compliance Verification Submittals, COM-4

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections of mitigation and/or other evidence of mitigation.

Verification lead times (e.g., 90, 60, and 30 days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal.** The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

**Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

Compliance Reporting, COM-6 AND COM-7

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix, COM-6 AND COM-7

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition (e.g., “not started,” “in progress” or “completed” (include the date); and
8. the project’s preconstruction and construction milestones, including dates and status.

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Pre-Construction Matrix, COM-5

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner’s **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix referenced above.

Construction and Operation Security Plan, COM-8

Prior to commencing construction, a site specific Security Plan for the construction phase shall be developed and maintained at the project site. Prior to commercial operation, a site specific Security Plan for the operational phase shall be developed and

maintained at the project site. The plans may be reviewed at the site by the CPM during compliance inspections.

Construction Security Plan

The Construction Security Plan must address:

1. site fencing enclosing the construction area;
2. use of Security Guards;
3. check in procedure or tag system for construction personnel and visitors;
4. protocol for contacting law enforcement and CPM in the event of suspicious activity or emergency; and
5. evacuation procedures.

Operation Security Plan

The Operations Security Plan must address:

1. permanent site fencing and security gate;
2. security alarm for critical structures;
3. perimeter breach detectors and on-site motion detectors;
4. video/camera monitoring system; and
5. fire alarm monitoring system.

The CPM may authorize modifications to these measures, or may require additional measures depending on circumstances unique to the facility, and in response to industry-related security concerns.

TASKS PRIOR TO START OF CONSTRUCTION, COM-5

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

Project owners frequently anticipate starting project construction as soon as the project is certified. In those cases, it may be necessary for the project owner to file compliance submittals prior to project certification if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important

that the project owner understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Final Decision

MONTHLY COMPLIANCE REPORT, COM-6

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date on which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the Key Events List. The Key Events List is found at the end of this section.

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification and preconstruction and construction milestones (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
4. a list of conditions and milestones that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;
5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification or milestones;
9. a listing of the month's additions to the on-site compliance file;
10. any requests to dispose of items that are required to be maintained in the project owner's compliance file; and

11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of any resolved complaints, and the status of any unresolved complaints.

Annual Compliance Report, COM-7

After the air district has issued a Permit to Operate, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings made to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file;
9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section]; and
10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved complaints, and the status of any unresolved complaints.
11. a listing of all outages planned for the coming year and a listing of all outages that occurred during the previous year, including the anticipated duration and the reason for each outage occurrence.

Confidential Information, COM-9

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20,

California Code of Regulations, section 2505(a). Any information, which is determined to be confidential, shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Department of Fish and Game Filing Fee, COM-10

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of \$850. The payment instrument shall be provided to the Energy Commission's Project Manager (PM), not the CPM, at the time of project certification and shall be made payable to the California Department of Fish and Game. The PM will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

Reporting of Complaints, Notices, and Citations, COM-11

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded inquiries shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at <http://www.energy.ca.gov/sitingcases>. Any changes to the telephone number shall be submitted immediately to the CPM who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form on page 11.

Facility Closure, COM 12 AND COM-13

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place, planned closure, unplanned temporary closure and unplanned permanent closure.

Closure Definitions

Planned Closure

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number:
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date: _____

(Attach additional pages and supporting documentation, as required.)

GENERAL CONDITIONS FOR FACILITY CLOSURE

Planned Closure, COM-12

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM).

The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities, until Energy Commission approval of the facility closure plan is obtained.

Unplanned Temporary Closure/On-Site Contingency Plan, COM-13

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with that for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan, COM-13

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24

hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with that for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental control when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

INFORMAL DISPUTE RESOLUTION PROCEDURE

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

FORMAL DISPUTE RESOLUTION PROCEDURE-COMPLAINTS AND INVESTIGATIONS

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Chairman, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Title 20, California Code of Regulations, sections 1232 through 1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES, COM-14

The project owner must petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to 1) delete or change a condition of certification; 2) modify the project design or operational requirements; and 3) transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes**. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the Energy Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of change process applies are explained below.

AMENDMENT

A proposed change will be processed as an amendment if it involves a change to the requirement or protocol, or in some cases the verification portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

INSIGNIFICANT PROJECT CHANGE

The proposed change will be processed as an insignificant project change if it does not require changing the language in a condition of certification, have a potential for significant environmental impact, and cause the project to violate laws, ordinances, regulations or standards.

VERIFICATION CHANGE

As provided in Title 20, Section 1770 (d), California Code of Regulations, a verification may be modified by staff without requesting an amendment to the decision if the change does not conflict with the conditions of certification.

KEY EVENTS LIST, COM-6

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION

DATE

Certification Date/Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
SYNCHRONIZATION WITH GRID AND INTERCONNECTION	
COMPLETE T/L CONSTRUCTION	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
COMPLETE GAS PIPELINE CONSTRUCTION	
WATER SUPPLY LINE ACTIVITIES	
START WATER SUPPLY LINE CONSTRUCTION	
COMPLETE WATER SUPPLY LINE CONSTRUCTION	

TABLE 1
COMPLIANCE SECTION
SUMMARY OF GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	PAGE #	SUBJECT	DESCRIPTION
COM-1	4	Access	The project owner shall grant energy commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-2	4	Compliance Record	The project owner shall maintain project files on-site. Energy commission staff and delegate agencies shall be given unrestricted access to the files.
COM-3	4	Reporting of Unplanned Outages	Throughout the life of the project, the project owner shall report all unplanned outages via e-mail to the compliance program manager and to the cpm immediately.
COM-4	4	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the cpm, whether such condition was satisfied by work performed or the project owner or his agent.
COM-5	6, 7	Preconstruction Submittals	Construction shall not commence until the all of the following activities/submittals have been completed: <ul style="list-style-type: none"> ▪ Property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ A pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ All pre-construction conditions have been complied with, ▪ The cpm has issued a letter to the project owner authorizing construction.
COM-6	5, 6, 7	Compliance Reporting During Construction: Monthly Compliance Reports	During construction, the project owner shall submit monthly compliance reports (mcrs) which include specific information. The first mcr is due the month following the commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the key events list. ¹
COM-7	5, 6, 8	Compliance Reporting During	After construction ends and throughout the life of the project, the project owner shall submit annual

¹ Key Events List is included on page 20.

TABLE 1
COMPLIANCE SECTION
SUMMARY OF GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	PAGE #	SUBJECT	DESCRIPTION
		Operation: Annual Compliance Reports	compliance reports (acrs) which include specific information. The first acr is due after the air district has issued a permit to operate.
COM-8	6	Security Plans	Prior to commencing construction, the project owner shall submit a construction security plan. Prior to commencing operation, the project owner shall submit an operation security plan.
COM-9	9	Confidential Information	Any information the project owner deems confidential shall be submitted to the Commission's dockets unit.
COM-10	9	Dept of Fish and Game Filing Fee	The project owner shall pay a filing fee of \$850 at the time of project certification.
COM-11	9	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the cpm, all notices, complaints, and citations.
COM-12	10, 12	Planned Facility Closure	The project owner shall submit a closure plan to the cpm at least twelve months prior to commencement of a planned closure.
COM-13	10, 12, 13	Unplanned Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned closure (either temporary or permanent) the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COM-14	16	Post-certification changes to the Decision	The project owner must petition the energy commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

COSUMNES PLANT PROJECT PSA PREPARATION TEAM

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Project Description	Kristy Chew
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